DOCUMENT RESUME

ED 365 286 IR 016 457

AUTHOR	Byers, Patricia Longwell
TITLE	Increasing Technology and Collaborative Learning Experiences of Teachers, Parents, and Students in a Middle School through Teacher Training, Parent Involvement, and a Mentorship Program.
PUB DATE	93
NOTE	155p.; Ed.D. Practicum, Nova University.
PUB TYPE	Dissertations/Theses - Practicum Papers (043)
EDRS PRICE	MF01/PC07 Plus Postage.
DESCRIPTORS	*Computer Assisted Instruction; *Computer Literacy; Cooperative Learning; *Educational Technology; *Inservice Teacher Education; Junior High Schools; Junior High School Students; Mentors; Middle Schools; Parent Participation; Staff Development; Teacher Improvement; *Teaching Methods
IDENTIFIERS	Middle School Students; Student Assistants

ABSTRACT

This practicum was designed to increase middle school students' use of their school's existing technology. The project was implemented in four phases. First, teachers participated in 10 in-service training workshops on the use of technology and collaborative learning as an instructional strategy. During the second and third phases a support/mentor system to help teachers use the technology at the school was offered. A weekly series of technology support meetings was held for teachers, incorporating training with discussion and shared practices. Twenty-five student mentors/aides were trained to assist teachers and students as they used technology in the classroom or the computer lab. Finally, parent workshops were held to share ideas on the use of home technology for educational purposes. Most of the practicum objectives were met or exceeded, including increased student use of technology, increased teacher implementation of technology and collaborative learning, and increased parental understanding of the use of technology. The success of the practicum suggests that the design of the four-phase program is an effective strategy to increase the use of technology in a school. Recommendations and a detailed implementation plan are included. (Contains 48 references.) (Author/KRN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

● Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED 365 286

Increasing Technology and Collaborative Learning Experiences of Teachers, Parents, and Students in a Middle School through Teacher Training, Parent Involvement, and a Mentorship Program.

by

PATRICIA LONGWELL BYERS

CLUSTER XXXX

A Practicum II Report presented to the
Ed. D. Program in Child and Youth Studies
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

NOVA UNIVERSITY

1993

IR016457

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY
Patricia Byers

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

PRACTICUM APPROVAL SHEET

This practicum took place as described.

Verifier:

Robert Hagemann

Principal-McIntosh Middle School

Title

701 S. McIntosh Road, Sarasota, Fl. 34232

Address

July 15, 1993

Date

This practicum report was submitted by Patricia L. Byers under the direction of the advisor listed below. It was submitted to the ED. D. Program in Child and Youth Studies and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova University.

Approved:

August 9, 1993

Date of Final Approval of Report

Barry W. Birnbaum, Ed.D., Advisor

BEST COPY AVAILABLE

ACKNOWLEDGEMENTS

The following individuals are recognized for their assistance and encouragement during the planning and implementation of this school improvement plan.

To my children, Jack and Jennifer; my mother, Theresa Hassard; and many dear friends whose unfailing love, understanding, and support have made this effort possible.

To Robert Hagemann under whose professional leadership this project was planned and completed at McIntosh Middle School. His encouragement and enthusiasm were invaluable.

To Jim VanFleet who patiently contributed both his expertise in the use of computer technology and his teacher trainer skills to the program.

To Dr. Barry Birnbaum under whose understanding guidance and professional expertise this project was undertaken and completed.

In memory of Jeannie Harrell who served as an inspiration and model in this endeavor.

and

God, our Heavenly Father, who supplied the inspiration, self-discipline, and many other gifts necessary for this accomplishment.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS .iii

TABLE OF CONTENTS iv

LIST OF APPENDICES v

ABSTRACT vi

Chapter

I INTRODUCTION .1

Description of Work Setting and Community . .1
Writer's Work Setting and Role. 4

11 STUDY OF THE PROBLEM 6
Problem Description 6
Problem Documentation 9
Causative Analysis. 11
Relationship of Problem to the Literature . 14

III ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS. 25

Goals and Expectations. 25
Expected Outcomes 25
Measurement of Outcomes 28

IV SOLUTION STRATEGY. 34
Discussion and Evaluation of Solutions. . . 34
Description of Selected Solution. 49
Report of Action Taken. 53

V RESULTS, DISCUSSION AND RECOMMENDATIONS. . . . 80

Result. 80
Discussion. 84
Recommendations 94
Dissemination 97

REFERENCES. 99

Appendices

A. DOCUMENTATION SURVEY 104

B. IN-SERVICE TRAINING PRE/POST ASSESSMENT. 108

C. IN-SERVICE PARTICIPANTS' CHECKLIST . . . 111

D. IN-SERVICE LESSON EVALUATION 113

E. EXPLANATION-TECHNOLOGY WHIZ KIDS 116

F. REQUEST FORMS-TECHNOLOGY WHIZ KIDS . . . 118

G. TEACHER INTERVIEW QUESTIONS 120

H. PARENT PRE/POST SURVEY 124

I. PROFESSIONAL DEVELOPMENT EVALUATION. . . 126

J. IN-SERVICE TRAINING OBJECTIVES 128

K. FACULTY PRESENTATION OUTLINE 131

L. DESCRIPTIVE INFORMATION ON PARTICIPANTS. 134

M. TEACHER COURSEWARE EVALUATION FORM . . . 136

N. WELCOME/PERMISSION LETTER-WHIZ KIDS . . 138

O. TECHNOLOGY WHIZ KIDS EVALUATION FORM . . 140

P. PARENT RECOMMENDATIONS-TECHNOLOGY USE . 142

Q. TECHNOLOGY GRANT WRITING INFORMATION . . 144

LIST OF TABLES

Tables

1 Frequency of Computer Lab Usage-1992-93 School Year 91

2 Frequency of Total Technology Usage-1992-93 School Year 92

ABSTRACT

Increasing Technology and Collaborative Learning Experiences of Teachers, Parents, and Students in a Middle School through Teacher Training, Parent Involvement, and a Mentorship Program. Byers, Patricia L., 1993. Practicum II Report. Nova University, ED.D. Program in Child and Youth Studies. Descriptors: Computer Assisted Instruction/Computer Literacy/Computer Uses in Education/Cooperative Learning/Educational Opportunities/ Educational Technology/Inservice Teacher Education/ Learning Strategies/Middle Schools/Professional Development/Secondary Education/Staff Development/Teacher Improvement/Teaching Methods.

In the writer's school,existing technology was not being used to its fullest potential. This practicum was designed to assist students in developing the basic skills necessary to use this available technology. Teachers improved skills necessary to incorporate technology in instruction through the use of collaborative learning as a teaching strategy.

The implementation was in four phases. The writer developed all training curriculum, prepared training materials, and co-taught the classes. A series of 10 in-service training workshops on the use of technology and collaborative learning as an instructional strategy was held on-site for teachers. The second and third phases developed a support/mentor system for the use of technology at the school. A weekly series of technology support meetings were held for teachers,incorporating training with discussion and shared practices. Also included was the training of 25 student mentors/aides who consequently assisted teachers and students attempting to implement technology in the classroom and/or the computer lab. Parent workshops were also held to familiarize parents with available technology and to share ideas on the use of home technology for educational purposes.

Four of the five practicum objectives were met or exceeded. Objectives met included increased student use of technology,increased teacher implementation of technology and collaborative learning, and increased parental understanding of the use of technology. The success of the practicum suggests that the design of the four phase program is an effective strategy to increase the use of technology in a school; recommendations and a detailed implementation plan are included.

****

Permission statement

As a student in the Ed.D. Program in Child and Youth Studies, I do (✗) do not ( ) give permission to Nova University to distribute copies of this practicum report on request from interested individuals. It is my understanding that Nova University will not charge for this dissemination except to cover the costs of microfiching, handling, and mailing of the materials.

August 18, 1993
date

Patricia L. Byers
signature

CHAPTER I

INTRODUCTION

Description of Work Setting and Community

The setting of the middle school used for this practicum is part of a county school system located in the southeastern United States. The community is graced with beautiful, white sand beaches as its western border is a large body of salt water. This fact contributes to its appeal as a tourist area.

The population of the community is approximately 50,961 while the county is estimated to have 277,776 residents according to 1990 census (United States Department of Commerce [USDC], 1991). The population fluctuates depending on the season of the year, with the winter months bringing a heavy influx of tourists. Another significant population factor is that people over the age of 64 comprise 54% of the population (USDC, 1991).

The main industry of the community is tourism with the majority of people being employed in service industries or government as it is the county seat. In addition, there are a small number of technological instrumentation corporations that have recently located in the community supplanting the boat building industry currently in a state of decline due to the country's economic problems.

The school, part of a county-wide school system which includes 35 schools, is located in the eastern part of the county. When the school was built in 1962, it was off the main thoroughfares in a ranching and farming community. In fact, the 111 acres for the school was deeded to the school board by a local rancher. In return for the land, the school board had to stipulate that there would be an on-going vocational agriculture program.

The setting of the school has changed dramatically over the years with population growth. In the early years, new growth was located in the western part of the county close to the lovely beaches. As all available land was used in that area, growth moved to the eastern and southern areas of the county. As a result of this pattern, the area surrounding the school is now growing rapidly.

Many families new to the community move to the area served by the school as it is one of the few sections of the community with affordable housing. Rental housing, at a premium in the county, was recently expanded by the opening of two large complexes both located within a mile of the school. This availability of affordable housing has been a contributing factor to the overpopulation of the writer's school. The facility is projected for approximately 1150 students for the current 92-93 school year and 1300 by 1994, while the suggested optimal size for a middle level school is 1000 students.

There is a total of 65 teachers on the faculty of the school with the average length of service in the teaching profession being 10 years. The racial-ethnic mixture of the faculty is 88% white, 8% black, 2% Asian, and 2% American Indian.

The socio-economic mixture of the school is rather unique. The combination includes about 9.8% of the school's population being bussed in from the urban black area, approximately 45% of the students being from middle and upper class homes, and the remaining 45% of the students coming from the rural farming areas. Originally there were few residential areas in the school's district: the school population was mainly from the black urban area and the farming community. This mixture has changed dramatically over the last 15 years with the building boom.

Due to the location of the school, about 90% of the students are bussed. This situation poses unique problems as far as students staying after school for activities or extra help. It is also a problem for parents who do not drive or own automobiles. These factors tend to make the school rather isolated, despite the addition of a public bus stop at the school in the past year.

The school has been a middle school serving grades six through eight for the past nine years. Prior to that time, it was a junior high school serving grades seven through nine. The school is a true middle school model with the following characteristics: inter-disciplinary teaming, block scheduling, at least three common planning periods per week for teachers to meet together, and advisor/advisee activities with the students.

Writer's Work Setting and Role

The writer's role presently is that of teacher of English on an inter-disciplinary team at the eighth grade level. This particular team has been designated the "high tech team" being the only group of teachers in the school with a bank of seven or eight networked computers in each room. Additional duties of the writer include that of Technology Committee member, Fund Raising Committee, chairperson of the Shared Decision Making Team, and a member of the School Advisory Council.

As an aspiring administrator, the writer is also a member of the county pool from which assistant principals are chosen. This has led to being used as a substitute administrator on occasion and to a month long administrative internship at a local high school.

The writer is active at the district level as a participant on the Secondary High Technology Team and as a member of the Teacher Evaluation Committee. As a certified teacher trainer, the writer can offer instruction in the following areas: technology, needs and characteristics of the middle school, critical thinking strategies, and cooperative learning techniques. Much of the writer's experience at the school and district level provides input at the community level on a task force concerned with the status of children and youth.

CHAPTER II

STUDY OF THE PROBLEM

Problem Description

Students at the writer's school did not possess the basic skills necessary for success in an information-based society. Two of the basic skills necessary for success in the information age include the use of technology and the ability to work collaboratively with others in a team effort.

Addressing the issue of technology at the writer's school: technology equipment was available but not frequently used by students or teachers. This equipment included the following: computers, CD ROMs, videodisc players, VCRs, LCDs (Liquid Crystal Display units for use with overhead projectors), camcorders, and phone modems for telecommunications.

In order to fully understand the availability of the existing equipment, the reader must have some background information. There is a computer laboratory containing 30 rather antiquated Apple 2E computers available for class use on a sign-up basis. The rest of the equipment is available for check-out from the media center. In both instances, the equipment was being used infrequently by students and faculty members.

There appeared to be multiple reasons why the problem existed with no solutions prior to the practicum. First, there was little technical support available when teachers wanted to use computers. Teachers were also extremely busy during the school year with little time or energy to do anything but necessary tasks. Even if there was more time, infrequent training was available on the use of computers and other technology. When the few courses were offered, they were always in another location which was an inconvenience. As a consequence of the above-mentioned items, there was little awareness of existing software for use with the existing technology.

A final probable reason for non-use of existing technology was that faculty members were not aware of how to integrate the use of technology with instruction in the classroom. To accomplish this, teaching strategies had to change from the traditional lecture method which the majority of educators at the writer's school continued to use.

There is additional equipment in the school which was and is presently being used to its fullest potential. The writer's team, consisting of four basic skills teachers, was formed during the 1990-91 school year to pilot a special networked technology program for the school system. This pilot consists of 32 student computers and 4 teacher workstations,used on a daily basis,in the four classrooms which are linked together in a local area network (LAN).

The computers are linked together through a central server which allows for sharing software and printers. It also enables the computer users to send and receive information that they have created to other people on the network. Also included on the network are 30 additional computers, located in another area of the school, for use by the students taking business occupations as an exploratory subject in grades six, seven, and eight.

While the network computers were and continue to be available for use only by the above-designated teachers, the strategic plan for technology at the writer's school includes the networking of the entire school and the provision of teacher workstations for all faculty members in the near future. This would be followed by banks of computers in each classroom as funds become available. With the computer lab and other existing technology equipment not presently being used to its fullest potential, there would seem to be little likelihood that future purchases would be used unless the problems were solved.

In conclusion, at the writer's school, students and teachers were not using available technology to its fullest potential. Students were not being prepared for the nation's information-based society. The educators themselves were not aware of the latest technology, and were not versed in the operation of the equipment so they could not adequately prepare their students for the present and the future.

In order to alleviate the problem, the following problems were addressed in this practicum at the writer's school: students' lack of basic skills necessary for success in an information-based society and faculty members not using available technology equipment nor incorporating teaching strategies which would enable them to do so.

Problem Documentation

Evidence that this problem existed was documented in several ways. At this time, a brief history of a computer laboratory told from the writer's personal observations is needed for background information.

In 1986, the school installed a new computer lab exclusively for the use of the English department. The writer, as English curriculum coordinator, arranged for in-service training. After the training, in a collaborative effort, the English department developed quidelines and student rules for the use of the lab and chose word processing software for use in the laboratory.

On August 17, 1992, in an interview with the media specialist who oversees the lab, the writer corroborated the fact that the lab was rarely used during the 1986-87 school year. Only 2 of 19 English teachers used the lab regularly, a few came infrequently, while the remainder never came. As a result of this infrequent use, the decision was made in 1987 to extend the use of the lab to all faculty members. During the 1987-88 school year, it was still used infrequently, according to the media specialist.

In 1988, the lab was disassembled with the computers being signed out to individual teachers as requested. In the interview of August 17, 1992, the media specialist indicated that during the 1988-89 and 1989-90 school years, the computers assigned to rooms were not being used. As a consequence, the decision was made to reassemble the computers in the lab setting for the 1991-92 school year.

The computer lab still was not being fully utilized. Records kept during the 91-92 school year indicated that the lab was used on the average of 3.25 periods a day. There are a total of seven periods a day during which it could be used. Analysis of the records indicated that only 20 of the school's 65 teachers used the lab during the 90-91 school year.

Further evidence of the problem was obtained in June of 1992, when the school's Technology Committee used a computer use-awareness questionnaire (see Appendix A for complete questionnaire). Of the 20 respondents, 18 indicated a need to learn about the latest technology equipment. Furthermore, 19 of the 20 respondents reported that they were not adequately trained in strategies that would allow them to incorporate technology in their instruction with students, and 19 of the 20 also indicated interest in teacher training in technology.

The committee then published a list of needs and goals. This document indicated that the school's available hardware and software was not being used to its fullest potential and adequate teacher training in technology was listed as a goal.

In June of 1992, the writer as a representative of the school Technology Committee, met with the parent organization. They indicated a need for further expansion of technology in terms of equipment, teacher training, and more time on computers for students.

In interviews done with 10 randomly chosen faculty members (fall of 1992), all of them indicated that continuing training is important in the area of technology.

Causative Analysis

There are many problems associated with educators and the use of computers. Many teachers feel that technology, particularly computers, has been forced upon them. Indeed it does seem that at the writer's school, it has been a case of putting the computer before the teacher. Computers appeared in the lab and in some classrooms, and teachers were expected to begin using them with only the perfunctory course in computer literacy.

It was the personal observation of the writer that not only were teachers inadequately trained, but they didn't have the technical support necessary to make them feel comfortable with this new entity. A third missing ingredient was adequate knowledge of teaching strategies allowing them to incorporate technology in instruction. This situation equates with educators fearful of appearing inadequate in front of their colleagues and students.

The newer technologies such as laserdiscs and CD ROMs, designed to be motivational teacher aids in the classroom, were not being used. Each type of technology was demonstrated at a faculty meeting as it became available for checkout, but hands-on training was never provided.

Few faculty members were aware of the existing software for computers, CD ROM discs, or laserdiscs; all of which is housed in the school's media center and available for checkout. These materials had not been demonstrated nor had any cataloging been done which would categorize them to the various disciplines. There was also excellent networked software at the school which would become available for use as the rooms become networked. Few faculty members were aware of this software nor were they trained in the use of this network.

Time is of the essence with most teachers. There are never enough hours in the day, and consequently a great amount of work is done after-hours in the home setting. Many teachers do not own personal computers or any other technology equipment, putting them at a great disadvantage because learning to use technology, particularly computers, is very time consuming. Some computer skills can be self-taught if one does have the availability of a computer, possession of a good manual, and infinite patience. Availability is of the utmost importance if one is going to learn by any method. Having technology hardware and software available for practice is absolutely vital for practice purposes when teachers are being trained. While technology equipment is available for checkout at the writer's school, due to most of it being heavy, bulky equipment, it is usually borrowed only over vacations (Byers, 1992).

There were two final issues directly relating to the use of technology, particularly computers. One issue was that of how to incorporate technology in actual student instruction. Much technology lends itself to students working alone, in pairs, or in small groups. The teacher using the traditional lecture method of instruction could not use technology to its fullest potential unless new instructional strategies were used. It is extremely difficult to change instructional methods used over the years spanning a teacher's career. It requires much training and a spirit of risk-taking, so often uncharacteristic of educators.

The final issue is that of the fear harbored by some educators that computers and technology will eventually take over the job of teaching. Educators fail to realize that technology will be an efficient aide to the teacher which in turn frees them to be instructional leaders and facilitators while students do the work of learning.

This entire section dealt with educators and their perceptions of technology. Students have not yet been addressed. In the hierarchy of education, change must begin with the teachers. When teachers begin to realize the value of technology in education, they will begin to use it in instruction, and it will then become a way of life for the students.

In a further attempt to investigate why more faculty members didn't use technology in instruction, the writer formulated a questionnaire for that purpose. It was used in interviews to elicit information regarding comfort levels and attitudes toward technology (see Appendix G for complete questionnaire).

Relationship of the Problem to the Literature

Educators are preparing tomorrow's leaders and members of the work force. The whole crux of the educational system is to prepare students to become functioning members of a democracy, ready to meet the timely challenges of living in the world as it is when emerging from a formal education. As John Dewey (1987) summarized in an explanation of democracy in society and schools: the need is for the creation of a democratic, social, and learning environment that maintains a maximum degree of continuity between life inside and outside the school.

Society today lives in a rapidly changing world. The advent of technology is literally changing the world as we know it. A message can be faxed across the world in a little less than a minute according to Thornburg (1989). The office can literally be anywhere thanks to new technology. Even an airplane can be the setting for the portable office when a person brings along their laptop computer and has access to phones. People are able to watch events going on anywhere in the world live on our television sets. Even the very vocabulary in the English is reflective of this technological revolution with terms such as bite, mouse, videodisc player, and CD ROM.

The world is on the threshold of a new global economy; the movement from an industrial economy to an information-based economy. In the United States and worldwide, there is an entirely different job market. Gone are the days when a worker needed only to be literate and able to follow orders, the necessary skills needed for an economy structured around mass production. According to the former Secretary of Labor, Ray Marshall (1990), what is needed and not presently available is: "...people who can impose some kind or order on that data to solve problems and improve the technology. So productivity is increased by knowledge, not by increased land, labor, and capital" (p. 70). Marshall also indicates that no longer can people with limited higher order thinking skills expect to go out into the work world and earn middle class incomes.

Workers are presently not being adequately trained for available jobs, and it will only get worse. Bissonnet (1990) projects that by the year 2000, 75% of all workers will need retraining, and that all workers new to the job market would have an average of four careers, two of which are not even in existence yet!

Sculley (1990) suggests that the United States is lagging behind. This author indicates that our businesses want to compete in this global economy but are unable to, a basically uneducated workforce being the reason. Scully also estimates that $30 billion dollars a year is presently being spent on remedial training in the workforce because students are not adequately prepared.

Marshall (1990) indicates that the United States lacks: " a highly skilled workforce to manipulate the sophisticated technology" (p. 70) necessary to compete effectively in the information age.

Kelly (1990) laments that the educational system has lagged behind; it does not teach the basic skills necessary for success in the American workplace. According to O'Donnell (1988), the ability to locate, access, and manage information is not being taught. D'Ignnazio agrees and goes a step further by adding the ability to work collaboratively with others is an important factor not being stressed in schools.

Numerous authors agree that this transformation can occur through the effective teaching of technology skills, augmenting all the various disciplines but that is not being accomplished in most schools. Presently many teachers are unprepared to teach computer technology skills, and as

Schlumpf (1991) indicates, teachers are the ones who must be empowered as they are the agents of change. There is general agreement by educators and parents that students need the abilities mentioned previously, but for the most part it is not happening.

There are many problems associated with educators and the use of technology as a teaching tool. The first problem that must be dealt with is convincing teachers that change must occur. While aware of all the previously mentioned research and what is needed in the work world of today, teachers have not "personalize" the need. Teachers do not realize the seriousness of the lag in education in the United States today.

Contemplate, for instance, the world a student leaves to come to school each day. Most have at least some technology at home: TV, VCRs, CDs, and many have computers. Upon arrival in the classroom, most students are faced with the "chalk and talk" style of teaching instead of the modern technology and the resulting visual and auditory stimulation (Bell & Elmquist, 1992; Thornburg, 1989).

In addition, according to Johnson & Johnson (1984), many educators are still teaching facts and theory as opposed to critical, high level reasoning skills.

One result of these two factors is that students choose not to work in school due to the fact that their needs are not being fully met, and this results in feelings of dissatisfaction. One need is to have fun, and the traditional classroom doesn't lend itself to having fun, according to Glasser (1987). When students go to classrooms like the ones described, interest and motivation is lost (Bell & Elmquist, 1992) and consequently, Thornburg (1989) reports that large numbers of students are dropping out of school with the result being they have few, if any, skills.

To summarize the first problem in bringing technology into instruction: educators have not been convinced that our society is in a time of rapid change due to the Information Age. Also lacking is the understanding that all educators must keep up with the change (Moursund, 1992). As Thornburg so aptly puts it: "Most schools are in the 19th century backwaters of technology, relying on chalk and pens while kids' bedrooms have television, computers, and CD players" (p.13). Teachers must be convinced that change begins with them.

While technology will not necessarily be the panacea for the total restructuring of education, the literature supports the problem of educators not only needing to be technology literate but also to use technology in teaching. The literature documents the fact that computers and other technology is not being used as a normal part of activities in so many classrooms.

In the writer's review of the literature, the problems of why educators are not using technology divide naturally into two separate categories. The first category could be distinguished as including external factors and the second category would be that of internal factors.

In exploring the external factors, the writer found that management often is a problem. Robbins (1988) cites risk tolerance as being an important characteristic of organizational culture. The author describes it as the extent that employees are encouraged to be innovative and seek to take risks. In most schools, teachers are not rewarded for being aggressive and taking a chance; in fact, the opposite is often true. In addition, administrators frequently do not model the use of technology themselves. As Dupagne and Krendl (1992) intimate, if the administrator in a school is not supportive of technology and doesn't model the use of computers, the faculty, staff, and students are also more likely not to develop the necessary skills to use technology effectively.

Strategic planning for technology often does not take place. On-going teacher training is thus often neglected. According to Scrogan (1989), continuing education in technology is necessary for growth in the teaching profession, and this is infrequently the case in school districts. Equipment is often purchased by the administration in a piecemeal fashion with no long-term goals in mind. The result is a conglomeration of different kinds of incompatible equipment. Also neglected are school goals which clearly state the vision for technology and make it clear to the entire faculty and staff. If this doesn't happen, technology is often used just for drill and practice or word processing, not for stressing higher order thinking skills (OTA, 1989).

Lack of adequate funding continues to be a problem also. In some cases, teachers have already been trained but have no equipment or have equipment without the proper wiring and/or software. In other cases, the teachers have equipment in need of repair and the school is not providing money for maintenance (Holden, 1989). Another scenario is the equipment is available, but the software is obsolete. Even if money is available for software, time is always a consideration with educators and previewing software is very time consuming, not to mention the difficulties with returning inappropriate software. Another problem discussed by Apple (1992) is: of the 10,000 software programs currently available, only about 200 of them are educationally significant. The author goes on to say that educators are at the mercy of software publishers and salespersons, many of whom may be motivated primarily by profit.

Woodhouse and Jones (1988) cite four reasons why computer activities are still not a normal occurrence in classrooms. The first constraint is lack of facilities. Computers are usually housed in a special room in the school and are therefore more difficult to integrate into classroom instruction. If computers are in the rooms, it is usually only one or two with very little appropriate software.

Along with a lack of facilities, a second important characteristic is missing--that of support (Woodhouse & Jones, 1988). Martin (1988) suggests that each school should have available trained technology aides available for support; in most schools this is not a reality.

The third constraint indicated by Jones and Woodhouse (1988) is lack of knowledge of instructional strategies. Teachers have great difficulty trying to tie the use of the computer with the traditional lecture approach to teaching that many have been using for years. Interestingly enough, Woodland (1984) indicates, after a study of 1000 classrooms around the country, that 70% of instructional time was spent in "teacher talk" with less than 1% being spent with student interaction. It would seem that new instructional strategies are badly needed, regardless of computers. Perhaps computers will act as the catalyst needed to bring about this change.

The last item or constraint mentioned by Jones and Woodhouse (1988) was a basic lack of knowledge about how computers work, how to operate them, or how to use the available software. Most computer training sessions for teachers are brief, held away from the work site with little hands-on experience, and usually have no follow-up. Additionally, many times due to lack of facilities, practice is virtually impossible.

To expand upon the last constraint, not only do teachers lack knowledge about the basics of computers and technology, the educators are not usually familiar with the more recent technological developments. One example would be networked computers which have been referred to by Abbott, Brennan, and Quick (1989) as the third revolution in computing behind only the mainframe and the personal computer. Equipment such as laser disks, CD ROMs, interactive video disks, Data Show LCDs, and the telecommunications items are becoming more accessible and common each day in schools, but frequently collect dust from non-use. The problem is evident: there is much for educators to become aware of and learn to use (Byers, 1992).

Even with knowledge of how computers and other technology works, adopting technology is complex. Unfortunately, when beginning to implement the technology, it gets more challenging before it becomes easier to use (OTA, 1989). Once the mechanics are mastered, there is yet another problem for educators: how to teach with it.

Stevenson and Stigler (1991) suggest still another external problem: teachers usually don't work in close proximity to one another. Generally teachers' jobs are done in isolation, not as a collaborative effort which could produce the help and support necessary when change is being attempted.

Sturdivant (1989) states that teachers have little opportunity to see successful models of classrooms using technology. It is far more advantageous to a practitioner to see something being done rather than hearing about it or reading about it.

A final external problem resides in the realm of families of students. As November (1992) indicates, families do not know how to use existing technology in the home to help children learn. The home technology is used, in most cases, for entertainment rather than as an educational tool. This has a direct influence on the student in the school setting as they come to class expecting that technology is primarily for entertainment.

While all of the external factors just discussed are vitally important, these items do not account for the educator who is adequately trained in the use of a computer, can use one, and perhaps does sometimes. The problem is the educator does not use it as a normal part of activities in the classroom even when the equipment is available.

The literature indicates that internal factors such as fears and attitudes toward change play a large part in the problem. As O'Donnell (1988) says, the negative attitudes expressed by some teachers are a result of fearing the unknown. These attitudes include: hating technology, wishing it would just go away, and thinking that it increases a teacher's workload: the old "one more thing to teach" approach.

Martin (1988) suggests that risk taking, noise and confusion, and requiring a real change on the part of the teachers are the problems. Sturdivant (1989) also acknowledges the idea of risk taking and says that there is a lack of recognition for people willing to do it.

Thornburg (1991) indicates that many of the approximately 200 million computers in classrooms across American today are not being used. In his opinion, the problem lies in the fact that teachers have little interest in computers because it is felt that the computers will not better their instruction.

There is also a lurking fear that computers will take over teacher's jobs. As O'Donnell (1988) states, teachers are fearful that computers will take over eventually causing educators to experience loss of jobs.

Katz (1992) indicates that: "...many teachers are bewildered by computers and adopt an attitude of fear and anxiety toward its use in the classroom" (p. 39).
Holden (1989) goes on to say:"Intelligent integration of technology requires them (educators) to rethink their roles and constitutes a major challenge to their flexibility and ingenuity" (p. 907).

In summary, the literature review done by the writer supports the problem. Teachers play a vital role as change agents in society. In this age of information, educators are not aware of the latest trends in technology and are not adequately trained in order to impart the information to their students. As a result, students are not being properly prepared to become functioning members of society.

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

Goals and Expectations

The following major goals and outcomes that were projected for this practicum will now be described. The general goal was that students at the writer's school would possess basic skills necessary to use the school's available technology. A second goal was that 12 out of 16 faculty members at the writer's school would incorporate technology in instruction. These same faculty members would also use collaborative learning as a teaching strategy to implement technology in their instruction.

Expected Outcomes

By the end of the implementation period, 12 out of 16 teachers would utilize technology in their lessons at least once a week as evidenced by a check list (see Appendix C for complete checklist).

The technology equipment included the following: computers (personal and networked versions), videodisc players, LCDs (Liquid Crystal Display units for use with overhead projectors), phone modems, CD ROMs, camcorders, and VCRs.

The evaluation tool was a checklist (see Appendix C for complete checklist), as well as a pre-assessment and post-assessment (see Appendix B for complete assessment) which included written answers and hands-on activities. A sample hands-on activity was the set-up of a laserdisc player and the demonstration of its use. Hands-on activities were chosen as they reflect true mastery of learning as concerns the use of technology.

By the end of the implementation 12 out of 16 teachers would use collaborative learning twice as a teaching strategy for use with computers and other technology equipment as evidenced by the completion of a collaborative learning unit in the participant's curriculum area. A follow-up self evaluation of two lessons would be required (see Appendix D for complete lesson evaluation).

The evaluation tools would be questions on the pre-assessment and post-assessment (see Appendix B for complete assessment), the completion of a cooperative learning unit in the participant's curriculum area, and two evaluations of actual lessons (see Appendix D for lesson evaluation). Units and the ensuing self evaluation of lessons were chosen as evaluation tools for the two reasons. When a written plan is required, it ensures that participants have planned and implemented the units. Self-evaluation causes the participants to weigh the merits and deficiencies of their work.

The standard of measurement would be 80% of the program objectives (see Appendix J for complete in-service training objectives) attained by 80% of participants on the post-assessment (see Appendix B for complete assessment). Measurement of collaborative learning would be the submission of the collaborative learning unit and two lesson evaluations (see Appendix D for complete lesson evaluation).

By the end of the implementation period, 12 out of 16 faculty members participating in the training were projected to request technical and/or teaching strategy support as evidenced in one of two ways: requests for a student aide (see Appendix F for complete student aide request form) or attendance at weekly support meetings.

The evaluation tools would be attendance at weekly support meetings open to participants and other interested faculty members or a written request for a student mentor (see Appendix G for complete student aide request form). These evaluation tools were used as they are completely objective and provided freedom of choice for participants; the opportunities were there but not mandatory.

The standard of achievement would be attendance at one of the weekly meetings or the use of a student mentor either in the classroom or in the school's computer laboratory at least once (see Appendix F for complete student aide request form). A questionnaire would also be completed indicating that support was available for them (see Appendix C for complete checklist).

By the end of the implementation period, 20 parents out of 25 would understand how technology is used in the writer's classroom and how it can be used as an educational tool in the home. This was evidenced by parents answering 80% of the questions correctly on a pre/post assessment survey (see Appendix H for complete survey) after participating in parent workshops.

The evaluation tool was attendance at one of the two parent workshops by a total of 25 parents.

The standard of achievement was measured by a 25% increase in the parents' scores from the pre-assessment score to the post-assessment score (see Appendix H for complete survey).

It was projected by the end of the implementation period that 400 of 1225 students would use the computer lab at least once a week as evidenced by the lab sign-in sheet housed in the media center.

The evaluation tool was the number of classes using the computer lab each week as evidenced by teacher sign-up sheets for the lab. These sign-up sheets indicates the number of students in each class.

The standard of measurement was the increase from the present 3.3 classes a day using the lab as evidenced by media center records from the 91-92 school year, to 4 classes a day.

Measurement of Outcomes

The teacher's utilization of technology in their lesson plans at least once a week was measured in two ways: by a check list (see Appendix C for complete checklist) and by a pre/post assessment question (see Appendix B for complete assessment).

The checklist (see Appendix C for complete checklist) was in written form and took less than two minutes to complete. It covered the availability of the following technology: computers (personal and networked), videodisc players, LCDs, phone modems, CD ROMs, camcorders, and VCRs. Included on the checklist was a section where the participant indicated whether they presently possessed the skills necessary to use the listed technology, frequency of use, and availability of technical support.

The pre and post-assessment (see Appendix B for complete assessment) included written questions on the use of the various technologies. Also included as part of the assessment was the hands-on demonstration of competence with the technologies. It included setting up and demonstrating the actual use of each of the technologies.

The teacher's utilization of collaborative learning as a teaching strategy for use with computers and other technology equipment was measured by the completion of a collaborative learning unit in the participant's area of specialization.

This unit was done in a collaborative manner with small groups of class participants working together during the in-service classes sharing ideas with one another. The final product of the unit was done in written form and submitted to the writer. Each participant was required to do two evaluations of actual lessons from the unit following classroom implementation (see Appendix D for complete evaluation).

The utilization of collaborative learning in classroom instruction was measured by a question on the pre and post-assessment (see Appendix B for complete assessment). The standard of measurement was 80% of program objectives obtained by 80% of the participants on the post-assessment.

The technical and/or teaching strategy support available was measured in one of two ways: teacher requests for student aides (see Appendix F for complete request form) or by attendance at weekly support meetings. Student mentors or aides were trained and available to assist teachers when they used technology. Weekly support meetings were held after the implementation of in-service training.

An evaluation tool was attendance records kept at the weekly support meetings. Another tool was written requests for student mentors (see Appendix F for complete request form). A third evaluation was a question on the participant's checklist (see Appendix C for complete checklist) asking if support was available when needed. The last tool was the use of the checklist again at the end of the practicum implementation.

The standard of achievement was attendance at one or more of the weekly support meetings or at least one written request for the use of a student aide (see Appendix F for complete request form). A 25% increase in the number of participants indicating that necessary support was available was the standard of achievement on the pre and post-assessment (see Appendix B for complete assessment) or the checklist (see Appendix C for complete checklist).

Parent's knowledge of how technology is used in the writer's classroom and how it can be used as an educational tool in the home was measured through attendance at one of two parent workshops given by the writer.

The evaluation tool included attendance records kept at each of the workshops and a survey administered before and after each of the two parent workshops (see Appendix H for complete survey). The survey contained such items as what technology is available in each participant's home, the primary use of the technology, a listing (by the participant) of other ways they could use technology in the home as an educational tool, and a listing of the ways they envisioned technology being used in the classroom. A list of the various technologies and a question asking which ones they were familiar with was also included. The last three questions were scored.

The standard of achievement was attendance at one of the parent workshops. Parents also answered 80% of the scored items correctly on the post-survey following participation in a parent workshop (see Appendix H for complete survey).

The number of students using the school computer lab was measured by a sign-up calendar sheet. The sheet included such things as the day of the week, the date, the periods that the lab is open, and a space for the teacher's name, and the number of students in the class. Also included was space to request any particular software needing to be used from the media center collection. The sheet took no more than one minute to complete and was conveniently housed in the media center which is adjacent to the computer lab. The calendar was supervised by the media specialist who kept records from week to week for the purpose of comparison with last year's preserved records.

The evaluation tool was the number of classes using the computer lab each week as evidenced by the teacher sign-up sheet indicating the number of students.

The standard of measurement will be an increase from the present 3.3 classes a day (the average from the previous school year) to 4 classes a day during the 92-93 school year.

Mechanism for Recording Unexpected Results

The writer kept a journal during the implementation period. Any activity concerning the practicum was entered. Also entered was any new note-worthy activity in the technology arena. This included actions by the technology team (as the writer is a member of that team), work in the computer labs, school activities (i.e. new uses of technology), additional research,and happenings in the district and community.

Participants in the various activities were asked for input on a regular basis. The in-service training participants were also required to do a final evaluation of the training for the Professional Development Center (PDC). The final evaluation asked for input on the relevance and quality of the instruction (see Appendix I for complete evaluation form). The results of these various evaluations, kept in the journal, indicated some unexpected events.

Participants were also asked to formulate their own goals as a word processing activity and continually assessed as to whether they were accomplishing their goals.

The writer also monitored the effectiveness of all facets of the implementation informally through inviting verbal feed-back from participants. Asking for constructive criticism on a one-to-one basis made the participants feel comfortable enough to be honest about suggestions for improvement. All feedback was recorded in the journal.

CHAPTER IV

SOLUTION STRATEGY

Discussion and Evaluation of Possible Solutions

The problem at the writer's school was two-fold; most importantly, students did not possess the basic skills necessary for success in an information-based society. According to research, two of the basic necessities required for success in this information age include the use of technology and the ability to work collaboratively with others in a team effort.

The second component of the problem was that while technology equipment was available at the school, it was not frequently used by students or teachers. This equipment included the following: computers, CD ROMs, videodisc players, VCRs, LCDs (Liquid Crystal Display units for use with overhead projectors), camcorders, and phone modems for telecommunications.

The 20 of the 65 teachers who used the available technology represented a small percentage of the entire faculty. The remaining teachers did not use technology in the classroom or in the lab nor did they use teaching strategies that would enable them to incorporate it (technology) in their teaching.

In the literature review, there is consensus on one issue: technology training is needed in the schools to prepare students for the global economy of the information age. In the "America 2000" plan, former President Bush talks of a complete restructuring of America's educational system and an age of technology that requires all students to become computer literate (United States Department of Education [USDE],1991).

In the writer's state, as in most other states, the Department of Education has developed a plan for the restructuring of education. According to this plan, the key to success for schools and students is having technology available and being used appropriately (Florida Department of Education [FDE], 1991). This plan also states the fact that information is doubling every five years so it becomes impossible for the teacher to be the prime source of information (FDE, 1991). Could it not be said that technology is becoming necessary for success in teaching?

Sculley (1990) suggests that already many businesses feel that they are unable to compete in the global economy because of a basically uneducated workforce. He goes on to quote a figure of $30 billion a year being spent on remedial training for people entering the workforce from the world of education. His solution speaks to adequate preparation within the schools.

Moursund (1992),in his discussion of technology, indicates that students can be empowered by: "...providing them with good access to modern intellectual productivity tools and instruction in their use" (p.5). Sturdivant

(1989) also indicates that technology can be a tremendous tool in helping to overcome problems existing with education in American today.

Many states do have technology curriculum requirements in place. One example is the state of Florida (State Board of Education [SBOE], 1989). This document stresses that computers along with other technology should be a major part of instruction. It goes on to say that all teachers and administrators should be computer literate and competent. In a recent communique, (Florida Department of Education [FDE], 1992) it is stated that: "Technology should be the major information source for students in schools" (p. 21).

Despite curriculum reform, as Kelly (1990) laments, American school systems have been painfully slow in reacting to new technology. It is a nationwide problem which is reflected at the writer's school. Kelly's ultimate goal would be educators teaching the basic skills by realizing and utilizing the potential of technology in education.

How to realize this goal is the crux of the problem being dealt with in this proposal. The writer's experience with computers over a nine year span have produced some definite ideas on the difficulty of educators accepting modern technology and the changes that accompany the use of this technology in the classroom.

A definite problem exists when trying to persuade teachers to begin exploring technology as a viable alternative for themselves. They have little opportunity to see technology modeled by educators who are using it successfully. Excitement could be generated through classroom visits where technology is being used. Sturdivant (1989) also suggests that school systems could prepare video tapes of successful models for using computers in the classroom with different types of children. These programs would have a variety of uses: they could be aired in schools, over the public broadcasting system in the local community to reach a broader audience including parents, could be viewed by individual teachers, or used for training purposes.

Another problem concerning technology is that it is extremely difficult to surrender complete control to a piece of machinery. There are so many "if's" when one gives up control. A prime example is: what if the computer "crashes" and I lose all my grades? One hears all kinds of horror stories about forgetting to save or accidentally erasing information.

In the field of educational computing, surrendering control is an issue which can be accomplished in two ways. The preferred sequence of events would be done over time during which one would have many positive experiences. These experiences would lead to a sense of confidence in the computer and allow the teacher to make the transition. The other way is when change is dictated and comes swiftly with no thought given to the human factors involved.

The literature has several suggestions for making this transition a smooth one.According to Adams (1993), there must be the realization of the monumental changes being asked of teachers: that of changing their basic beliefs of how learning takes place. In order for such a change to take place, school administrators must be trained to help teachers become change agents. This administrative training needs to include skills such as providing strong support and being patient, as teachers will need much time to go through this transition.

Ringstaff & Sandholtz (1993) agree, but add one additional component: teachers must be given latitude and permission to experiment. Poets are allowed poetic license, and teachers must be given a license for experimentation.

Sturdivant (1989) advises that since teachers are key players in the success of getting technology into the classroom, school systems must invest in and take care of their teachers. Scrogan (1989) indicates that most teachers would like to learn technology if the proper support is given. He believes that effective in-service technology education can bring teachers into the technology age. Poirot (1992) agrees, saying: "Any and every technology project should start with quality educational training for the teachers involved. The training should not center on the equipment or even on the software, but rather on the integration of the system into daily classroom instruction" (p. 30).

Several authors have opinions regarding in-service training. Jones and Woodhouse (1988) suggest using a Stages of Concern type of questionnaire at the beginning of any training on computers. This information allows the instructor to better understand the comfort levels of the participants. The rationale of the authors is that faculty members come with varying levels of experience and feelings concerning computers. This type of information allows instructors to meet the individualized needs of all participants. This allows participants to feel more comfortable and less threatened by the computers.

Jones and Woodhouse (1988) also mention several other items essential in planning for training. A school should have a total school development plan for technology training and a budget should be allocated for such. Too often things are done in a piecemeal fashion. The training segments should be sequential according to the authors. First should come the operation of the hardware or equipment, software second, and appropriate teaching strategies last. The authors also suggest that the use of computers should be subtly integrated in schools through the use of computerized card catalogues and student records. Their last suggestion was the possibility of requiring teachers to use available computer labs at least a half hour a week.

Berger and Novak (1991) reiterate several authors when they suggest that all educators have convenient access to a computer either in their office or their room. Too often this is not the case; the computers are located in a lab away from the classroom. All the training that a teacher may have with computers will not become a part of their knowledge bank unless they have the opportunity to practice what they have learned. Easy access makes this more feasible.

School managers can be helpful with the issue of availability. They can facilitate the speed with which teachers become comfortable with technology by allowing them to take computers and other equipment home whenever feasible. It could be done over weekends, holidays, and during the summer months with regular personal computers. It could be done daily if the schools will make the purchase of laptop computers a priority.

Lee (1991) suggests that teacher workshops be offered after school hours for in-service credit and that each school have a paid resource person providing support for other staff members. It would also be a definite advantage to have in-service training offered at the job-site of the participants. The convenience of on-site training encourages more participation. The actual times of the workshops can then be reflective of that particular school's time schedule whereas if teachers from other schools are involved, those schedules would have to be considered. This might result in long waits for the on-site teachers.

Kelly (1990) also suggested that there must be incentives for educators to change as regards the use of technology. These incentives could be such things as being paid to take training, being offered hardware and software in return for taking training, and also becoming a "lead" teacher. This could be developed into a career ladder for the willing, enthusiastic teacher; they could be trained and then they, in turn, would lead others to technology. Sturdivant (1989) reports on a particular study done on training of "model teachers" who became the leaders at their schools, agreeing to provide technical training and support for other teachers. They were paid a $2000 annual stipend and were required to take 30 hours of up-date training yearly. The important thing was the on-site availability of training and support. The author ended by stressing that the job of teacher trainers becomes that of fostering great enthusiasm for continuing development of technology skills among other educators.

Tobin (1987) states that training should always be at the option of the teacher, and that it shouldn't be an end in itself. He feels that follow-up activities should be scheduled after initial training. Certificates of completion for the participant and confirmation letters of acceptance into the class are recommended by Tobin as well.

What constitutes effective in-service computer education programs? Scrogan (1989) recommends several components when actually planning course objectives. The teacher trainer should begin with clear and relevant objectives which are shared with in-service participants. Once the objectives have been established, detailed lesson plans should be formulated.

According to Scrogan (1989), it is extremely important to have a balance between lecture and hands-on activities to accommodate the various learning styles. It is also suggested that there be lesson related materials and handouts. This could take the form of written step-by-step instructions for hands-on activities. Lesson related research articles could also be the subject of class discussions and activities.

Having the in-service lessons model activities that the participants can take back and use with their own students is perhaps the most important component affirmed by Scrogan (1989). Educators want to see ideas modeled that allow them to deal with individual differences in the classroom, so the author makes the suggestion that whatever is done with training activities should be reflective of strategies for teaching heterogeneous classes. Adams (1993) also agrees that the modeling of the different types of teaching strategies should be used by teacher trainers.

The final components stressed by Scrogan (1989) are follow-up opportunities after the in-service training, and the use of coaching or mentoring situations during the actual training. According to the author, this type of situation helps to overcome "computer phobia" felt by so many individuals.

This idea of coaching and mentoring during in-service training is a common theme in much of the available literature. Collaborative learning can become the framework for the in-service training and will accomplish the goal of coaching and mentoring as well as modeling appropriate strategies. In keeping with this theme, Ravid and Shapiro's (1992) study: "...indicated the majority of students and all teachers preferred cooperative learning. The teachers perceived themselves as better, more focused practitioners as a result of using cooperative learning in the classroom" (p. 96). Glasser (1987) says that the use of teams or group learning with students increases satisfaction and makes the students more apt to work in school when it is used.

Perhaps the most substantial commendation for collaborative learning comes from Dishon and O'Leary (1984):

> ...that cooperative learning, when compared with competitive and individualistic learning, results in higher achievement, greater achievement motivation, more positive attitudes toward learning, more constructive relationships among students even when students vary in ethnic background and achievement levels, higher level reasoning processes, higher self-esteem, and greater interpersonal competencies." (p. vii).

Lewis (1988) implies that computers could also allow for widespread sharing of ideas and concepts. What better way to start than in a collaborative group with one's colleagues when learning technology? It also allows the meeting of the individual needs of each participant as some are novices and others are more advanced in their use of technology. The use of collaborative learning allows for the sharing of knowledge and has the added advantage of contributing to a non-threatening environment during instruction: one feels more comfortable asking for help on a one-to-one basis. In this way, the educators are also practicing the same collaboration that they can use as a part of their teaching strategies in the classroom.

An additional advantage of collaborative learning introduced by DeVillar & Faltis (1991) is that of facilitating the integration of minority students. This, in turn, leads to greater appreciation of cultural diversity through increased communication that naturally transpires during collaborative learning. The authors go on to say that technology can be the vehicle for this because it inspires the change. It is the writer's opinion that this can be an important advantage for the in-service training of teachers as well as for students.

Working in a collaborative mentoring situation leads into two other areas of research; that of software called "groupware" and telecommunications. No in-service training in technology would be complete without some exploration of existing software. This software naturally divides into two varieties: teacher management software and student curriculum-driven software.

Teacher management software could be classified as a tool or time-saving aide for the educator. Things such as electronic grade books and test maker programs actually "buy" precious time for the educator. This allows them more time to be the facilitator of learning in the classroom instead of spending long, laborious hours shuffling papers and averaging grades.

Much student software is curriculum specific, but there are certain universal questions to be asked when evaluating software regardless of the academic discipline.
Does the software allow the teacher to "bookmark" or keep track of exactly what a student has done? Does it have mastery evaluations which are automatically scored? These things are very important as they save the teacher a great deal of time.

Another consideration centers around whether software encourages critical thinking skills. According to Sculley (1990), critical thinking skills are a must in the work world: "...in the Information Age we want these people to make decisions, to have critical thinking skills to analyze data and make judgments on the basis of that analysis" (p.4).

The newest concept in software, which is called "groupware" has a distinctive correlation with collaborative learning. Groupware involves using networked computers and allows the users to have group interaction with other students on the network.

There are many other benefits to collaboration regardless of the ages of people involved, whether teachers or students. Foyle & Lyman (1991) see five definite benefits. First, they refer to enhanced feelings of well being for the participants. There seems to be more feelings of acceptance when interacting in a small group, and it usually is more pleasurable as well. Secondly, the authors stress the academic achievement possible in this situation. This is another way of saying that two heads are better than one. Social skills development, another important aspect offered by the authors, is touted as building more positive attitudes among the individuals in the group. A fourth attribute stresses that there is usually more productivity in a group versus individual efforts. This, in turn, usually means fewer discipline problems as everyone in the group is busy. Lastly, there seems to be a built-in mechanism for motivation. Perhaps it is due to the individuals feeling that there is less risk of failure in a group as compared to working alone.

Another form of collaboration can be developed through the use of telecommunications as part as in-service training. With a simple phone modem, the computer can open up the world to the teacher (and also to the student). According to Beals (1991): "Networks offer opportunities for conversation across space and time in ways different from those found in other channels of communication" (p. 74).

Isolation of teachers has been an age-old problem in education. For the majority of each duty day, teachers are in the company of students only. There is little time for interchange with one's colleagues. Sturdivant (1989) feels that communications networks can help to overcome this obstacle. This author indicates that telecommunications leads to sharing of information concerning hardware and software as well as collaboration on lesson plans. Not only do these positive things happen, but the support and interchange of ideas that is offered is often invaluable.

Two other issues are also directly related to collaboration. Both issues concern support for educators attempting to incorporate technology in their teaching. One issue is on-site support available when needed and the other is off-site support. Scrogan (1989) speaks of school systems needing to build in close support for successful training. Specifically mentioned were building and district level technology personnel who need to be free to work with educators.

In doing research for this paper and in the past two years while doing a pilot project with networked computers, the writer has some additional solution ideas to be considered when dealing with these technology problems.

It has come to the writer's attention that students are tremendously motivated by computers, and they are usually very quick to learn the operation of new hardware and software. Many come to the writer's grade level with advanced computer skills and are very anxious to use them to help others, including the teacher. These students are definitely a resource; they could be identified, trained, and act as mentors/support for other teachers and students. Weir (1989) says, "Teachers need to feel comfortable in not being the sole provider of knowledge. They need to be prepared to learn from students, to learn with students" (p. 66).

When students are used as support personnel, there are many benefits. The most obvious benefit would be those already discussed: students providing technical assistance to others which in turn alleviates fear and frustration on the part of the teacher or student receiving the help.

Often overlooked are the benefits involved for the student providing the service. According to Ringstaff & Sandholtz (1993):

> "Slow" students blossomed, "unpopular" students gained peer approval, and "unmotivated" students stayed in at recess to work. Moreover, as students took more responsibility for their learning, they benefited from improved academic performance, increased self-esteem, and a sense of ownership in the instructional process. (p. 6)

Parents could also be involved in the practicum. The priority issue is that of having students develop skills in the use of technology. If parents become familiar with what is going on in the classroom and become educated as to what they can do to use technology in the home in an educational way, they will be a support to their students. As they become familiar with the existing technology, they might feasibly become involved at school as support staff for teachers or students learning technology.

In conclusion, Sturdivant (1989) warns the that the future of technology in education is difficult to envision, but envision it we must if we are to prepare our students for the real world. She goes on to say that we must invest in and nurture our teachers, for therein lies the key to success. Once the teachers have "bought" into technology, they can begin to foster great enthusiasm for developing technology skills among students.

Description of Selected Solution

On the basis of the preceding research concerning solutions and suggestions, the writer chose several strategies as the solution. The attempt was made to formulate a plan generic in nature which could be easily duplicated yet unique enough for the writer's school with its many individual characteristics.

Due to the fact that many teachers have been able to get by without using computers in their teaching, a perception has been formed that computers are not essential in the education of students. The first objective of the solution attempted was to change these perceptions by awareness of solid educational practices using technology in the classroom. This was a preparatory step for meeting the goals of faculty members incorporating technology and collaborative learning in their teaching. This was also necessary to meet the general goal of having the students at the writer's school possess the basic skills necessary to use the school's available technology.

The first step was a presentation planned in order to arouse interest in technology; explaining why it is vital for educators to incorporate technology in the classroom. New software and hardware was demonstrated also. Collaborative learning as a teaching strategy for implementing this technology into teaching was also mentioned. The desired effect was to get the faculty excited, interested, and wanting to experience more by signing up for an in-service class.

After the presentation, the major strategy was announced: a teacher in-service training course so that they too could learn to use all the technology in the way demonstrated. The class would also include the implementation of collaborative learning as a teaching strategy. Invitations were also extended to visit the writer's classroom where technology is being used in connection with collaborative learning.

This major strategy consisted of a series of 10 in-service training workshops on the use of technology and instructional strategies to implement technology in teaching. The desired impact or result would be teachers using collaborative learning as a teaching strategy to incorporate technology in instruction. Consequently the school's students would gain the basic skills necessary to use technology.

The training was done in conjunction with the school system's Professional Development Center (PDC) and was held at the writer's school on a day and time indicated by the prospective participants as being most convenient for them.

Upon successful completion of the 10 week program, the teachers received 30 in-service credits toward salary enhancement and/or state recertification. The credits could be used toward recertification in all teaching areas. At the last class session, participants received two certificates of completion, one for their records and the other was sent to the district personnel office for inclusion in the participant's personnel file.

Although participating in such a training class was voluntary, another incentive (other than the in-service credit) was offered to encourage participation. Offering to place technology in the participants' classrooms (as it becomes available) was the incentive.

Since the research indicated that a major stumbling block in teacher use of technology was the lack of support available, a support/mentor system was also developed by the writer. The impact of such a program was to have help available when needed and the desired effect would be that of increased use of existing technology by teachers and students.

The program had two distinctive elements. The first was a series of technology support group meetings held by the writer after the in-service training was completed. Participants of the training and other staff members were invited to attend. At the meetings, informal discussions covered such areas as shared practices, successes, failures, problems with the implementation of technology and collaborative learning, and a review of the use of all technologies presented in the in-service training.

The second element was training student mentors who were then made available to go to the lab or individual classrooms to assist teachers and students attempting to implement technology. The writer conducted the mentor training and did the necessary scheduling.

The final element of the practicum was parent workshops held to familiarize parents with the technology available in the writer's school. It has been the writer's experience that when parents are informed and involved in school, there is a positive effect on student performance. The desired impact of this strategy was more use of technology by the students thereby enhancing their basic skills with technology due to the increased practice.

Research was done, literature was ordered, and ideas were formulated on how parents could organize home technologies for educational purposes so that technology is used for learning and not just for entertainment.

Report of Action Taken

The following information summarizes the actions taken during the eight month implementation of the proposal. Certain work was done in the preplanning stages prior to implementation. Actions to be taken in the future in connection with the practicum are also described. All the actions were designed to accomplish the goals and objectives of the practicum as described previously.

PREPLANNING ACTIVITIES

Prior to implementation, the writer met with the school administration, the technology committee, and the parent organization to explain the practicum goals. Permission was requested and granted to pursue the practicum, with one minor change. The writer had requested permission to arrange for "substitute time" drawings at faculty meetings as an incentive for faculty to use the computer lab. This was not granted by the administration due to budget constraints.

The writer met with the school district's Professional Development Center to plan for the in-service training to be taught. The objectives purposed by the writer were approved and permission was granted to offer the 30 hour in-service training component on-site at the writer's school. The writer, being a PDC teacher trainer, was also granted permission to teach the class. A request for a stipend to teach the class was not granted due to financial restraints. The writer then petitioned the parent group for a $500 stipend to teach the class; this was granted upon completion of the 10 week course.

The writer was also chosen to become a district level "Secondary High Tech" teacher and became part of a pilot project made possible by a state grant. As a result, the writer obtained a 386 IBM computer with a CD ROM, a laserdisc player, and a camcorder as classroom equipment. The writer was also provided with a 92-93 school year budget of $3,000 for the purchase of additional hardware and software.

A proposal entitled "The Marriage of Cooperative Learning and Technology" was prepared, submitted, and approved for presentation at the 1992 state level English conference.

A literature search was conducted by the writer to obtain specific information regarding technology and collaborative learning. From this information, the writer designed an interview form to be used with selected faculty members (see Appendix G for complete interview questionnaire).

IMPLEMENTATION

MONTH ONE

The writer chose 10 randomly selected members of the faculty to interview (see Appendix G for complete interview questionnaire). Permission was also requested to video tape the interviews for possible inclusion in a video on technology and collaborative learning. Only three of the teachers interviewed gave permission for taping. The reason given was that they did not feel comfortable in front of the camcorder.

A brief presentation was made at a regularly scheduled meeting regarding the importance of technology in teaching (see Appendix K for faculty presentation outline) by the writer. The in-service training course, Technology Use and Instructional Strategies was then announced, to be held at the writer's school for the convenience of the participants. A brief meeting was held with interested personnel requesting input on days and times for the classes. A schedule was arrived at after careful consideration of religious holidays and other input. An outline of the objectives was also distributed to interested personnel. A request was granted to one person from another school to be a participant in the class.

The writer made contacts with various state and local telecommunication bulletin boards requesting information on setting up accounts for the participants of the in-service training. This would enable them to receive and give support to others subscribing to the network.

The writer experienced difficulty when planning with the facilities department in reference to the after-school use of two classrooms for the in-service training. It was necessary to use two classrooms so each participant would have a computer at their disposal. The problem encountered was concerned with temperature control in the classrooms. The southeastern United States is hot during the fall months, and there are no windows in the school; air conditioning is necessary. Apparently the air conditioning system in the writer's school is rather antiquated because in order to provide two rooms with cool air, the entire school has to be air-conditioned at great expense. This had to be approved by the principal as well as the district level facilities department because the individual school air conditioners are controlled by timers at a district level location.

The final activities included the development of specific lesson plans with the teaching colleague who would be assisting the writer in the in-service training course. Plans were entered in the journal being kept by the writer since the beginning of the implementation for the purpose of recording practicum happenings. The second activity was the preparation of a welcome letter to all participants. It also outlined the class objectives, noted times and dates of classes, and requested that each participant bring a three ring notebook to organize handouts.

MONTH 2

Specific handout materials were prepared by the writer along with transparencies and assessment materials to be used in the teaching of the in-service class in collaboration with the teaching colleague. These included step by step instructions in the operation of the various technology components, check lists, and various evaluations and request forms.

The first class of the in-service training was taught by the writer with assistance from the teaching colleague. The colleague's primary role was in the area of technical support. The focus of the class was on the explanation of a computer network and its benefits. The hands-on activities centered around the operation of computers, both when used as part of a network and as a stand-alone unit.

The first class began with a pre-assessment (see Appendix B for complete assessment). The goals and objectives for the entire training component were outlined; participants were given a copy. The goals for that particular class were written on a flip-chart and reviewed also. In addition, each participant was asked to list three personal goals to be accomplished during the 10 weeks of training.

Participants were randomly grouped into collaborative units of four during the first class. Collaborative learning was utilized for the entire 10 weeks, although for some activities, participants worked in pairs rather than in groups of four. This approach enabled the participants to both experience collaborative learning and to support one another when doing hands-on activities with unfamiliar technology.

Another activity carried on during all the classes was that of having times set aside to allow the participants to share informally with one another. Mentioned earlier was the fact that teaching is a lonely profession with little time for interaction with one's colleagues. Allowing time for the interchange of ideas is time well spent. Enhancing this time were refreshments which is also important when attempting to train at the end of a full day of teaching. The instructors provided food for the first session and the participants, working in pairs, provided refreshments for the remaining sessions.

There was an additional mandatory activity during the first week. The network of computers used for this training was purchased from the IBM Corporation. IBM (International Business Machines) sponsored a seminar in the writer's town, during the first week of training, entitled "Eduquest". The writer and teaching colleague were invited because of being in the pilot project. The writer contacted the company and asked for permission for the class participants to attend as well. Permission was granted and participants were exposed to the latest developments in technology.

In preparation for the second class, the writer collaborated with the assisting teacher colleague. Materials were prepared including a series of simple, step-by-step instructions for using appropriate software. The second class had as its focus, integrated software systems. An explanation of the components of such software was explained with a standard program used as the example. The participants then explored the three parts of the program (word processing, data bases, and spreadsheets) and produced a word processing document as a hands-on activity.

The objectives for the class were presented on a flip chart and explained by the writer. A lecture type of setting was then used by the writer to both demonstrate the use of a LCD (liquid crystal display used with an over-head projector and attached to a computer) and to explore the various functions of Microsoft works.

Following the whole group activity, the participants continued to work collaboratively during the second class. For the hands-on computer activities, they worked in pairs. Each participant had their own computer, but they sat next to one another working together to figure out any problems that arose. When forming these partnerships, the writer suggested that participants who were more advanced in the use of technology pair up with novices.

While the hands-on activities were taking place, the writer and teaching colleague were able to move among participants answering questions and helping with any problems that were experienced. The role could be described as that of a facilitator.

The third class was also held during month two. The writer planned with the teaching colleague prior to the class. Objectives were again presented at the beginning of class on a flip chart. The focus of the class was available software on the network as well as in the computer lab. Part of the lecture was a demonstration, using the LCD (liquid crystal display), of how to access curriculum software on the network. The second part of the class was going to the computer lab, having participants chose software from their discipline, and preview it. Each participant was required to do two software evaluations (see Appendix M for complete courseware evaluation form).

Again, the participants worked in pairs and the writer and teaching colleague acted as facilitators.

MONTH 3

Classes four through seven of the ten session in-service training were planned with the teaching colleague. Each class began with a whole group overview which included the objectives for the class and a demonstration of the equipment being used or an explanation of a teaching strategy.

Class four and five concentrated on collaborative learning as a teaching strategy in the classroom allowing for the effective integration of technology into instruction.

Class four concentrated on the establishment of collaborative learning groups within the classroom structure. Grouping of students was discussed, both random and teacher selected samples, and also how frequently to change the students within the groups. The advantages and disadvantages of each type were listed. Size of groups was also a topic. Recent research was duplicated and given to participants for reading and discussion purposes.

The physical layout of the classroom when using collaborative learning was debated. The importance of having a "locator map" in the room was stressed, particularly in light of groups frequently changing students. It is also useful when a student has been absent and needs to see assignments that his/her group had during the absence.

The importance of the establishment of rules was outlined. Ideas for rules were discussed and noted. Stressed was the importance of displaying the rules in the room as a constant reminder of expectations.

The various roles within a group were also discussed. Each participant in a collaborative learning group is generally assigned a role. The most common assignments include: manager or facilitator, recorder, presenter, timekeeper, gopher (the person who is out of their seat getting supplies, handing in work etc. for the group), and voice monitor (the person who keeps the noise level of their group at an acceptable level).

The emphasis on social skills and the development of team or spirit building activities within the group structure was also discussed. Ideas were discussed, modeled, and listed for both areas.

Participants were asked to consider what ideas they would incorporate in implementation of collaborative learning within their own classroom.

Class five focused on the preparation of collaborative learning units. Discussion was held as to the various ways in which to organize curriculum into workable units for groups to do. The writer and teaching colleague shared how group work is organized in each of their respective classrooms. Movement of students within the room was also discussed; do the groups move to different locations everyday or does the "work folder" move and the groups remain stationary? A variety of methods were explored and noted for future reference.

The use of technology "centers" was discussed whereby students use the various technologies within the context of collaborative learning. An example would be the use of a bank of computers within the classroom. The students would begin the class by listening to the instructions for the day's activity being read by the group manager. The group would then move to the area of the room where the computers were housed. At that time, either pairs of students would be working together on one computer or each student would have their own computer but would be seated with their "computer partner". They would then proceed to complete their technology assignment either as an individual or as partners. Another example would be a center involving the use of the videodisc player. The group would begin in the same manner as the computer group: the manager reading the instructions to the whole group. The group would then move to the TV/videodisc center. The member of the group best able to use the videodisc player would be in charge of locating the information and running the equipment. The recorder would write down any responses required by the group.

A question/discussion time followed. At this time, a lengthy explanation of the required collaborative learning unit was given. Each participant was required to prepare a unit in their discipline that incorporated collaborative learning and the use of technology. A minimum of two lessons was expected; no maximum length was set. The unit had to actually be taught by the participant.

The unit was to be planned, implemented, and submitted in written form to the writer no later than the last class session. Approximately six weeks was allowed for this activity. In addition, two of the lessons had to be self-evaluated by the teacher on a form distributed by the writer (see Appendix D for complete lesson evaluation). The evaluations were also due the date of the last class.

The remainder of the class time was used to form new collaborative learning groups based upon the participants' subject area. These new groups then began planning together for their collaborative learning units. They were allowed to prepare basically the same units with modifications for their particular age/grade level.

Class six concentrated on the use and operation of the videodisc player in the classroom. The set-up of the videodisc player was explained and demonstrated in the Level I mode and in the Level III mode.

Level I is where the videodisc player is used in conjunction with a TV set. It can be operated with a remote control device where one puts in numbers to find certain frames or by way of a scanner unit which eliminates the use of numbers.

A Level III videodisc operates in conjunction with a computer and requires the loading of specific, compatible software on the computer. The control of the Level III then is on the computer keyboard. This interactive videodisc set-up is rather complicated for a novice, but the available software is excellent.

Following the demonstration, participants worked in pairs to practice the set-up and use of Level I videodiscs. They also used Level III software which had been previously loaded on the computer. Participants previewed several curriculum-specific videodiscs.

Class seven was dedicated to the demonstration and use of a camcorder. The writer amassed all the camcorders in the school for use during this session. Students, well-versed in the use of camcorders, were also used for this class. After the initial demonstration and hand-out with step-by-step instructions, collaborative groups were assigned a camcorder and a facilitator to help. Each participant was to practice the set-up of the camcorder and the filming of a short segment. The participants then viewed their videos and critiqued them.

MONTH 4

During the fourth month of practicum implementation, the eighth, ninth, and tenth in-service classes were conducted by the writer assisted by the teaching colleague.

The preparation of post-assessments were completed and the midpoint progress report was compiled.

The eighth class had as its focus the operation of the LCD (Liquid Crystal Display used in conjunction with an overhead projector to utilize computer software in whole class instruction).

After the class objectives had been shared, the advantages of LCD use were discussed. These include: being able to use all available software as a teaching tool, being able to demonstrate the use of various software that students will be using, and eliminating the use of chalk in the classroom (chalkdust being somewhat harmful to computers).

Two units were demonstrated: one used with IBM compatible computers and the other used with Apple and Macintosh compatible computers. The set-up of the equipment was stressed as it is rather complicated for computer novices. The writer used tape to label all connections for the three available LCDs. This, along with a handout, provided some support when participants were attempting it with their partners. Also stressed was the common sense approach to hook-ups. Actually showing participants that in most cases, there is only one place on the computer that a plug from the LCD unit will fit and the in-put and out-put theory. The hands-on activity of setting up the LCD and actually using it in conjunction with the computer was the highlight of the class.

Part of the class was spent in the writer's classroom demonstrating the IBM LCD and the second part was spent in the computer lab with the Apple LCDs which are available for use in the Apple lab and on rolling units for classroom checkout.

The ninth class focused on the operation of phone modems and telecommunications. After the objectives of the class were covered, the advantages of telecommunications were discussed by the writer, teaching colleague, and participants (some of whom had already had experience with some form of telecommunications). Also covered was some of the networks that are available for teacher use, both on a subscriber basis and free.

The class then proceeded to the media center where the media specialist demonstrated the use of the phone modem on a state network for use by educators. The collaborative learning groups each met with the specialist for the demonstration while the remaining groups explored software in the computer lab located adjacent to the media center.

Following the demonstration for the collaborative learning groups, the writer and media specialist worked individually with each participant helping them to get their own password and to log on the system. They each received written instructions on how to log-on, a place for them to record their pass word, and instruction on how to set up the phone modem on the rolling unit available for checkout. Participants were also warned that they must log-on to the network within a two month time span, or their password would be removed, and they would have to go through the process again.

A demonstration of the *local school district's network* was demonstrated as well, and information was given to participants on applying for a password.

The final class focused on the use of the CD ROM in classroom instruction. Following the introduction of the class objectives, a general overview and explanation of CD ROMs was given. A demonstration of the equipment set up and several CDs was given. It's value as a easily accessed reference tool was stressed.

Participants practiced the set-up of the equipment, and previewed several CDs. The equipment was labeled with tape for ease of connecting with the computer. Also prepared was a handout for participants which included simple step-by-step directions for use of the CD.

Concluding activities were then held including participant completion of post-assessment (see Appendix B for complete assessment), a check list (see Appendix C for complete checklist), and the Professional Development Center's evaluation form (see Appendix I for complete evaluation form). The teaching units and two required lesson evaluation forms (see Appendix D for complete lesson evaluation form) were also collected.

Post-assessments were graded upon completion and certificates were awarded to all participants scoring 80% or higher who had attended all sessions (a requirement of the Professional Development Center), and completed all written and hands-on components.

An announcement was made to the participants regarding the series of weekly technology support meetings to be held after school for the purpose of encouraging the use of technology in the classroom and to provide ideas and support to teachers attempting to integrate technology in instruction. The meetings will also provide a forum for teachers to share frustrations, concerns, successes, and questions. Participants were urged to participate, possibly for additional hours of credit.

The formation of a group of students to aid teachers and students in the technology area was also discussed. Input was requested from participants as to the type of help they felt would be most valuable.

The writer conducted a midpoint assessment as to the effectiveness of the program. Included in the assessment were such items as number of participants successfully completing the in-service training module and the use of the computer lab by students and teachers.

MONTH 5

The writer, in finishing the in-service training component of the practicum, forwarded the results of the participants pre and post-assessments and evaluations with the Professional Development Center as required by the state for courses used for recertification purposes.

In discussions with the Professional Development Center, the writer asked if it would be possible to grant in-service credit for the second component: the weekly technology support group meetings. Permission was granted for 10 hours of credit to participants who attended all sessions. The writer decided on eight meetings of a one hour and fifteen minute duration and prepared an agenda for the meetings.

This agenda was publicized by announcing it at a faculty meeting and putting a copy of the agenda on the back of a daily bulletin which goes to the entire faculty and staff. It was explained that while credit was available for those who could attend every session, it was not necessary to go the credit route. Everyone was encouraged to come to those sessions which would be of interest to them.

Publicity and reminders for each session were done through the school's daily written bulletin which is also talked about on the live broadcasted "Morning News" program. The writer would include a short paragraph with some leading questions to arouse interest in the topic.

The writer contacted the school district's technology office for the purpose of requesting to teach the same in-service class to interested district personnel. Funds were available for stipends and the course was advertised in a school district publication listing all the in-service training offerings.

The first support group meeting was held in the school's computer lab. The writer, assisted by the media specialist, gave a demonstration of "troubleshooting" in the lab. This topic was offered due to numerous complaints by teachers using the lab about the problems that they had experienced particularly with malfunctioning computers and in trying to use the existing printer set-up which consists of four computers sharing one printer.

Following the demonstration, the writer disassembled computers and printers and the participants, as their hands-on activity, reassembled them. They used a word processing program to check the set-up and printed to be sure that they could aid any students having difficulty with the use of printers.

The second meeting was held; the topic was laserdiscs. The set-up of level I and level III laserdiscs were demonstrated. A local computer store representative was invited to discuss and demonstrate the loading of the computer software for the interactive level III videodiscs.

The participants then had the opportunity to explore several laserdiscs, both level I and level III.

MONTH 6

The third support group meeting was held; the topic was the integration or use of collaborative learning groups and technology in the classroom or in the lab. It was stressed that the two, when combined, greatly ease the implementation of technology into instruction.

Information was prepared and distributed along with research on collaborative learning. A videotape on the subject was also shown, and discussion was held regarding the suggestions from the videotape.

The formation of collaborative groups was discussed along with rules and roles or jobs within the groups. Also discussed was the adoption of curriculum for collaborative learning as well as preparation of materials and teacher strategies and roles while students are engaged in collaborative learning.

The fourth support group meeting included student demonstrations of multi-media projects done on the writer's team with Linkway software. The participants were then invited to do a multi-media software tutorial program. The students and writer also explained the assignments given to the students that resulted in the multi-media projects and what choices were included for the students.

Planning, necessary public relations, and permissions were carried out as regards the formation of a group of students to serve as mentors/aides for faculty, staff, and students wishing to use technology in their daily schedule.

The planning included several decisions. The first item was the number of students to involve; the writer decided to recruit approximately 25 students from the seventh and eighth grade as there is always attrition when working this age student.

Where the students would come from was the second decision. It was decided to have the majority be eighth grade students from the writer's team due to the ease of scheduling. The remainder would be seventh grade students from a team whose teachers the writer was previously affiliated. This team was chosen as they are very cooperative, use technology and collaborative learning to a large extent, and would like to share its advantages with others.

Initial permission to do the component was granted by the administration prior to implementation. A memo was completed outlining the plan for the student group, and discussed with the principal. The writer's team and the seventh grade team met with the writer on separate occasions to discuss the plan, the details on scheduling students to be out of class after training was completed, and input on the choice of students. Permission was granted by both teams of teachers as well as the administration.

Public relations was handled in two ways. The component was announced at a faculty meeting and the writer indicated how these students might be used by requesting teachers. Some of the suggestions made were: to demonstrate to teacher and/or class how to use certain equipment or software, to assist the teacher in the room or in the lab when using technology, to assist students using technology, to load software for teachers, to assist in setting up the computer lab with the appropriate software, and so forth.

The next step was the planning process. This included the final choice of students by the writer, contacting each student to explain and ask if they were interested, and confirming the choice in writing (see Appendix N for complete letter and permission form).

The training sessions were held during a period designated as an activity period plus two lengthy sessions after school. After training was complete, the group met with the writer once a month to discuss ways to improve the program, the sharing of teacher evaluations (see Appendix O for complete student assignment and evaluation form), problems encountered, and previewing new software and hardware.

The training included instruction of each of the major types of technology (computers, both networked and personal, VCRs, camcorders, laserdiscs, CD ROMs, and LCDs). Troubleshooting in the computer lab was also included because of the past problems and antiquated equipment. The students had the opportunity for hands-on practice with each technology. Discussion was also held regarding behavioral expectations which are included on the teacher evaluation form (see Appendix O for complete student assignment and evaluation form).

Following the training, the students were asked to fill out a form for the writer indicating which technologies they felt confident with and from this, the writer compiled an "expert user list". This list was used by the writer to schedule students as each request form (see Appendix F for complete request form), when completed by the teacher, listed the hardware and software they planned to use. The requests were then matched with those students who had expertise with that equipment and/or software. Attention was also given to the rotation of assignments so that each student would have an opportunity to serve and also so that the same students were not missing an inordinate number of classes.

MONTH 7

The actual scheduling of student mentor/aides began as teachers made requests. As students were assigned, they had to take a notification slip to all their teachers whose classes would be missed for their initials. If there was a problem (such as a test being given), another student would be assigned.

The writer discovered that a pass system needed to be developed both as a reminder to students and for use in the halls of the school so that students would not be challenged as to the legitimacy of their whereabouts. Passes were designed and laminated for repeated use.

The requesting teacher received written verification with the name of the student who had been assigned along with the student's homeroom teacher's name in the event they wished to contact the student.

The writer, when making assignments, suggested to the student that they try to see the teacher prior to the assignment time. This gave both the student and teacher an opportunity for communication in addition to the written request.

The technology support groups continued with meetings five through eight being held during month seven. The fifth meeting's topic centered around the use of software entitled "The Accelerated Reader". As this program encourages reading of good literature by individual students, all English teachers were strongly urged to attend.

This program was explained, including the automated bookkeeping system, and demonstrated for all present. The hands-on activity consisted of having the participants do a test over a book that they had read so they could experience the software.

The session ended by urging the teachers present to become advocates of this program to encourage school-wide reading. It was also mentioned how it ties in with the school's two day a week silent reading program.

The sixth technology support group meeting consisted of exploration of available software for the school's Apple computer lab. A preliminary review was held by the writer on the operation of the computers. The participant's chose some applicable software for their discipline, after viewing the entire school's collection, and explored it with the writer acting as a facilitator when needed.

The seventh support meeting concentrated on the use of the camcorder in the classroom. The session began by the writer and participants exploring ideas on how camcorders could be used as a teacher tool and how it could be incorporated into classroom instruction and student assignments.

The second phase of the meeting was a demonstration of the use of the equipment. The participants were given written step-by-step instructions, and they practiced doing a short video segment and then critiquing their work.

The eighth and final technology support meeting centered on the use of the CD ROM in the classroom and an exploration of some of the school's available CDs. This topic was chosen as the school recently purchased a CD ROM unit which will be housed on a library cart with the necessary computer and be available for checkout.

Following this activity, participants and the writer discussed further ideas on school support for teachers using technology. As part of this topic, the writer an on-going invitation for visitation and observation in the classroom, as well as service as a resource for both technology and cooperative learning.

Each participant was asked to fill out the necessary evaluation form from the Professional Development Center(see Appendix I for complete evaluation) and a checklist (see Appendix C for complete checklist).

MONTH 8

The writer completed information for the Professional Development Center as regards the technology support group meetings. This was necessary because in-service credit was being issued, and state requirements had to be satisfied.

Planning for the two Parent Technology Workshops began. The writer planned the agenda after completing the objectives. An introductory letter with times, dates, and purpose was prepared for the parents and sent via students.

Both workshops were held during this month and were identical in content. A pre and post-assessment was used (see Appendix H for complete assessment/survey). Students demonstrated the various types of technology available on the team. Some demonstrated multi-media projects that they had completed as part of class assignments. Parents were divided into collaborative learning groups and were given the task of recording ideas on how to use home technology as an educational tool. The ideas were then shared with the large group with the writer facilitating.

The final activity was for each parent (or parents in some cases) to work with their student as a mentor in exploring some available software on the network. Students also shared examples of some of their work done on the computer during the course of the school year.

The writer concluded the evening by inviting them to use the ideas generated at the meeting. The writer also encouraged parents to consider the purchase of a computer, if possible, indicating that research suggests that students with computers get better grades in school and are more interested in learning. The evening ended with the serving of refreshments and informal exchanges between parents, writer, and students.

The concluding activity was the careful organization of all written information derived from the practicum for the purpose of evaluation and analysis for the final report of the practicum.

CHAPTER V

RESULTS, DISCUSSION AND RECOMMENDATIONS

Results

The problem existing at the writer's middle school was that students did not possess the skills necessary for success in an information-based society. According to the research, two skills necessary for success in this information age include the use of technology and the ability to work collaboratively with others.

A major goal of this practicum was to increase the number of students at the writer's school who possess the basic skills necessary to use the school's available technology. By establishing training and support for teachers in the area of technology and collaborative learning, by involving students as mentors/aides, and by assisting parents in becoming aware of the potential educational benefits of technology and collaborative learning, the writer believed that numbers would be more likely to increase. As these numbers increased, the students would have the additional benefit of experiencing and developing their skills in the ability to work collaboratively with others.

Objective 1: 12 out of 16 teachers participating in a 10 week in-service training class in technology and collaborative learning would utilize technology (including computers, VCRs, CD ROMs, laserdisc players, camcorders, and LCDs [Liquid Crystal Display units used in conjunction with computers and overhead projector]) in their lesson plans at least once a week by the end of the implementation.

In examining this objective, there are two outcomes to be evaluated: the number of participants completing the in-service training and the number who utilized technology in their plans as evaluated by a checklist (see Appendix C. for complete checklist) and by 80 percent of the program objectives being attained by 80 percent of the participants on the post-assessment (see Appendix B for the complete assessment).

The outcome concerning the number of participants completing training was not met. There were 16 participants who began the training and 14 completed the training. During the eighth week (out of a total of 10 weeks), one participant moved. Illness caused another participant to miss week nine and ten.

The second outcome was met: 12 out of 14 (75%) participants indicated the utilization of technology on the checklist (see Appendix C for complete checklist) and 14 of 14 scored 80% or above on the post-assessment (see Appendix B for complete assessment).

Objective 2: 12 out of 16 teachers would use collaborative learning twice as a teaching strategy when using technology as demonstrated by the completion of a collaborative learning unit, two self-evaluations of lessons from the unit (see Appendix D for complete evaluation), and by attainment of 80% of the program objectives by 80% of the participants on the post-assessment (see Appendix B for complete post-assessment).

The number of participants dropped to 14, as explained previously; however, in each area 14 out of 14 participants (100%) met objective 2.

Objective 3: 12 out of 16 teachers completing the in-service-training were projected to request technical and/or teaching strategy support as evidenced in one of two ways: request for a student aide or attendance at a weekly support meeting (later phases of the program following in-service training).

This objective was not met: of the 14 teachers completing the training, 3 requested either a student aide or attended a support meeting.

Objective 4: 20 out of 25 parents attending a parent meeting would understand how technology is used in the writer's classroom and how it can be used as an educational tool in the home setting as demonstrated by a 25% increase in parent scores from the pre-survey to the post-survey (see Appendix H for the complete parent survey).

Of the 45 parents attending one of the two parent workshops, there was a 25% increase from the scores on the pre-survey mean score of 58% to the post-survey mean score of 73%.

Objective 5: 400 of 1200 students would use the computer lab at least once a week as evidenced by an increase from 3.3 classes a day using the lab during the 1991-92 school year to 4 classes a day during the 1992-93 school year.

Although the number of classes a day using the lab was 3.0 (or 15 classes a week) instead of 4.0 classes for the 92-93 school year, the class sizes rose from approximately 28 to 33 students. This would indicate approximately 495 students a week used the lab (15 classes times 33 students per class) which exceeds the outcome expected.

Now that the writer's goals, methods of evaluation, and ensuing results have been presented, the PDC (Professional Development Center) activity evaluations (see Appendix J for complete evaluation form) will be discussed. The evaluation form is required of all participants taking classes done in affiliation with the PDC. It includes five questions requiring a ranking ranging from strong agreement (represented by a 4 ranking) to strong disagreement (represented by a 1 ranking).

The results of the evaluation (see Appendix I for complete evaluation) show that the participants strongly agreed, with a top ranking of 4.0 that they had the opportunity to be involved in the training and to ask questions. They also indicated strong agreement that the activity was relevant to their needs (3.5), that the activity fulfilled its objectives (3.6), and that the instructors were knowledgeable and prepared (3.7). The lowest score was in the area of participants being prepared to apply what they had learned in the activity (3.4). In the open ended questions, many participants voiced concern about readily available equipment being needed as a follow-up to this training.

Discussion

With the increased emphasis on the use of technology and working collaboratively as a team, more inclusion of these two areas is being demanded in the educational setting.

During the project implementation, four strategies, based upon recommendations from the literature, were used to encourage the use of technology and collaborative learning by teachers and students.

The first strategy implemented was the 30 hour in-service training class for teachers entitled "Technology Use and Instructional Strategies". As Woodhouse and Johnson (1988) stress: educators lack basic knowledge about how technology and software works and need appropriate training.

Pritchard and Busby (1991) also discuss the importance of staff training saying: "Without adequate training your technology will not be used fully and the investment's potential may be lost" (p. 51).

As indicated in the results section, the objectives were met or exceeded in most cases. The utilization by participants of technology in weekly lesson plans was presumably due to five components of the in-service training: all learning styles were accounted for in instruction, simple step-by-step written instructions for each type of technology were supplied, individualized help and lesson modifications were available, and the use of collaborative learning.

In-service participants beginning to use collaborative learning as an instructional strategy could also be attributed to the effectiveness of the in-service training. As Adams (1993) reiterates, training needs to be reflective of strategies for teaching heterogeneous classes. This was modeled in the course by having participants work in randomly selected groups. They were also assigned jobs or roles in the groups, helped to establish rules, and had tasks assigned to be achieved within the groups. The participants were also given hand-out materials on the various aspects of group formation. They were required to complete a collaborative learning unit in their discipline, and teachers of the same discipline were encouraged to collaborate on the units.

The instructors served as cheerleaders for this particular strategy and modeled its flexibility, particularly in how it can be used in conjunction with traditional lecture strategies. A slow, simple transition from lecture strategies was stressed: key words included experiment, start slow, and forget curriculum as you presently know it.

The second phase of the practicum was the scheduling, planning, and implementation of a weekly technology support group designed to give support to any staff member attempting to use technology and/or collaborative learning. As stressed by Scrogan (1989), such follow-up opportunities after in-service training help to overcome "computer phobia". This training was on-site during after school hours and offered 10 hours of in-service credit for attendance at all sessions.

It was predicted that the in-service participants (who had already completed the training) along with other faculty members would take advantage of these support meetings or request a student aide to further increase their skills in technology. This outcome was not met. Only 3 of the projected 12 out of 16 attended or requested an aide.

The attendance at the weekly meetings averaged five faculty members. Possible explanations for the poor attendance include the idea that the in-service "graduates" already felt comfortable with the use of the various technologies as many of the in-service lessons were replicated during support group meetings.

Further explanations could include meeting times and dates. Perhaps if arrangements could have been made to have it during the school day during planning time, it would have been better attended. Also, the meetings were held during the spring months. Perhaps a more effective time would be in the fall when school begins. Enthusiasm is at a peak following the summer months. More reminders and public relations might have also increased attendance.

The idea of times and dates flows to another unanticipated outcome. As mentioned previously, the district level technology office offered the writer an opportunity, complete with a stipend, to teach the same in-service training class for district teachers. The class was advertised but by the cut-off date, the minimum number of participants had not been met. It was also during the spring months and at 4 P.M. in the afternoon. Again, poor timing may be a cause.

Phase three was the formation of the student mentor/aide group known as the Technology Whiz Kids. While it was again anticipated that participants from the in-service training would request student aides, this was not the case. Again, a possible reason is that they felt confident using the technology themselves with no help .

The formation of the group was successful; however, as evidenced by 16 out of 65 teachers requesting aides at various times during the implementation period with excellent evaluations of students.

The students were utilized either individually or in small groups for the following activities: set-up of equipment, booting hardware with particular software, trouble shooting in the computer lab, assisting students and teachers during classes when technology was being used, working with individual teachers attempting to begin using technology, assisting the media specialist, working with small groups of students in the computer lab without the teacher, being indirectly supervised by the media specialist, and using software to produce products for teachers (banners, certificates, graphs, and so forth).

The following is a quote from one of the school's daily bulletins. It was written by a teacher (Hand, 1993) after having used student mentors:

> A big thank you to the Technology Whiz Kids. I had the privilege of working with these wonderful kids last Friday in the computer lab. They were super! I arrived with my class to find the lab set up and ready to go. The "Whiz Kids" were with us every step of the way, taking care of any problems we had with computers, printers, etc. With the "Whiz Kids" by my side, I will never fear computerland again! If the lab seems more trouble than you've got time for-invite the "Whiz Kids" to make it easier for your. You won't be disappointed. (p.1)

The implication is that this is a service needed and used at the writer's school.

The fourth phase of implementation involved parents of students from the writer's team of 135 students. This team is known as the "high tech" team due to the availability of technology as described in chapter one.

Two parent meetings were held attended by a total of 45 parents. This far exceeded the goal of 25 parents anticipated to attend.

There were two purposes for the meetings: to expose parents to the available technology in the writer's classroom and the sharing of ideas on how home technology can be used for educational purposes.

The successful achievement of these purposes was measured by attendance and by a 25% increase in parent scores from the parent pre-survey to the post-survey scores.

A third outcome, which was unanticipated, was the opportunity that the students had during these meetings. The writer served as a facilitator at the meetings while the students demonstrated all the technology. Their presentations were excellent and added much to their self-esteem, not to mention the parent's pride. The students also guided their parents in the use of the various technologies and shared with them projects done on the computers.

The parents also had the opportunity to experience and understand collaborative learning while completing a list of recommended ways to use home technology for educational purposes (see Appendix P for complete list).

In the final analysis, students using technology and experiencing collaborative learning in instruction was the goal. Teachers are the agents of change, so much of this discussion section had been devoted to the effects of the practicum on them.

How did the practicum affect students: did more students use technology and collaborative learning? The answer is yes. Approximately 495 students a week used the lab. In addition, the writer's team has a total of 16 classes a day using technology, and there are 2 other teachers who teach 6 classes a day using the 30 computers in each of their rooms. There is also technology equipment available for checkout in the media center through the use of a sign-out sheet. The sign-out sheet made determining the use of that equipment possible. Table 1 summarizes the total computer lab usage for the 92-93 school year while Table 2 covers the use of all technology, including the computer lab, for the 92-93 school year.

Table 1 is proof that the computer lab is still under utilized; there are several periods a day when it sits idle. The explanation is echoed by many faculty members: the Apple computers in the lab are antiquated and as a result often don't work properly. In addition, the computers have no hard drive and are of the single disk drive variety making the booting of the equipment tedious and time-consuming. Also each printer supports four computers, and there are on-going problems with loose cables and improper connections.

Table 1

Frequency of Computer Lab Usage 1992-93 School Year

Weeks	Days/Week	Periods/Week	Mean[a]
1	4	2	0.5
2	5	2	0.4
3	5	12	2.4
4	5	20	4.0
5	5	14	2.8
6	4	18	4.5
7	5	12	2.4
8	5	11	2.2
9	5	10	2.0
10	5	19	3.8
11	5	12	2.4
12	3	8	2.6
13	5	2	4.6
14	5	17	3.4
15	5	20	4.0
16	5	11	2.2
17	5	13	2.6
18	4	9	2.3
19	5	18	3.6
20	5	22	4.4
21	5	16	4.0
22	5	14	2.8
23	5	16	3.2
24	5	13	2.6
25	5	12	2.4
26	5	17	3.4
27	4	12	3.0
28	5	11	2.2
29	4	4	1.0
30	5	15	3.0
31	5	17	3.4
32	5	15	3.0
33	5	23	4.6
34	5	13	2.6

Note. Period Mean for 1992-93 school year is 2.995 periods a day. Figure derived at by calculating total period use per week and dividing by the total number of days.

[a] periods per week divided by days per week

Table 2

Frequency of Total Technology Usage 1992-93 School Year [a]

Weeks	Days/Week	Periods/Week	Mean [b]
1	4	150	37.5
2	5	194	38.8
3	5	208	41.6
4	5	213	42.6
5	5	224	44.8
6	4	174	43.5
7	5	270	54.0
8	5	263	52.6
9	5	266	53.2
10	5	231	46.2
11	5	214	42.8
12	3	136	45.3
13	5	195	39.0
14	5	221	44.2
15	5	268	53.6
16	5	232	46.4
17	5	241	48.2
18	4	197	49.2
19	5	242	48.4
20	5	202	40.4
21	5	160	40.0
22	5	214	42.8
23	5	228	45.6
24	5	245	49.0
25	5	241	48.2
26	5	257	51.4
27	4	188	47.0
28	5	243	48.6
29	4	192	48.0
30	5	247	49.4
31	5	249	49.8
32	5	263	52.6
33	5	279	55.8
34	5	241	48.2

Note. Period Mean for 1992-93 school year is 48 periods a day. Figure derived at by calculating total period use per week and dividing by the total number of days per week.

[a] Total technology includes computer lab, classes using media center technology equipment on a check-out, and classes having a bank of computers in the room.

[b] periods per week divided by days per week.

Useful software for the lab is also limited. There are only two software programs with a site license; most of the others are single copies. The school technology committee has not recommended spending much money on software for this lab, yet resources are not available for purchasing new hardware. Software will remain a problem as long as the existing hardware remains.

An additional problem is the ever increasing larger class sizes. Just the movement of 30 some students back and forth from a classroom to a lab is a logistic nightmare. It is much easier for the teacher to remain in the classroom.

When analyzing Table 1 and 2, one can see that most technology is utilized in the classroom setting. While the writer feels that the practicum was a success in all areas, it would seems that we need to direct our efforts to placing technology in each classroom in addition to teacher training, available support, and involvement of students and parents.

As Kelly (1990) laments regarding American education's excruciatingly slow reaction to technology: it is a problem nationwide as well as in the writer's school system. Technology is available but not being used to its full potential in education. Kelly's goal is having educators realize and utilize the potential of technology in the classroom.

Recommendations

The following recommendations could increase the use of technology by students and teachers at any given school.

1. That the focus on the purchase of hardware should be on placing networked banks of computers in each classroom rather than in the lab setting.

2. That classrooms with technology use collaborative learning as the instructional strategy to most fully utilize the potential of the technology.

3. When students use technology, it is suggested that the most beneficial way is in groups of two to a computer and in small groups with other types of technology.

4. Each school should have a strategic plan for technology which includes both short and long term goals. Included in these goals should be decisions regarding what manufacturer's hardware to purchase, what type of network will be installed, and what percentage of the budget should be earmarked for teacher training.

5. In-service training in technology and collaborative learning should be on-going in every school. It should be held on-site for the

convenience of participants. Whenever possible it should be held during the duty day.

6. Schools should include the purchase of laptop computers in their hardware budgets. Checkout of this and other technology equipment should be encouraged for both teachers and students. This will help to address the inequality issue of availability of technology for every student.

6. Teachers should be provided with extrinsic rewards for taking the risks and time necessary to learn new methods of delivering instruction such as the use of technology and collaborative learning. Some rewards that could be used include technology equipment for the classroom, a software budget, and released time for observation in other model classrooms.

7. Administrators should serve as models by using technology themselves and even taking training along with faculty members.

8. On-site technical support must be available, particularly for network support.

9. Each school district should provide teachers access to a telecommunications network. This is excellent in terms of sharing ideas and

receiving and giving support to one another.

10. Involve parents by means of workshops and training in technology. Share ideas about the educational use of home technology. It allows for a greater understanding of school processes, better communication, a feeling of belonging, and pride in their children's work.

11. Encourage risk taking school wide; offer new pilot programs as frequently as possible in technology and collaborative learning.

12. Schools should identify and train groups of students to act as mentors/aides in the area of technology.

13. Each school should form a grant writing committee. The goal of this group would be to obtain grants for hardware and software purchases(see Appendix Q for grant writing information).

14. Encourage fundraising for purchase of technology. Involve parent groups, students, local community and businesses, and staff.

15. School districts should encourage and arrange for opportunities for teachers to meet and share ideas. Have hardware and software vendors come and demonstrate equipment.

16. Send as many staff members as possible to technology conferences and encourage presentations.

17. Open up your school's technology resources. Have after school classes for students in technology and adult classes as well.

Dissemination

Dissemination of the practicum ideas have already begun. The writer presented a project session at the state English conference entitled "The Marriage of Cooperative Learning and Technology". The presentation was well attended and enjoyed by participants as they worked in collaborative groups with hands-on activities on a computer network. Evaluations were excellent.

The writer has shared the four phases of the practicum at two meetings of teachers and administrators: a district level secondary hi tech meeting and a two county meeting of interested teachers and administrators.

After being shared with the administration at the writer's school, the abstract and recommendation section will be directed to the district superintendent, the technology supervisor, and the Professional Development Center.

In the future, this practicum will be the subject of a proposal to present at the state technology conference and the National Educational Computing Conference.

A copy of appropriate sections will also be sent to the National Resource Center for Middle Grades/High School Education for possible inclusion in their next symposium.

The West Central Regional Management Development Network, a state-sponsored educational training agency, will receive a copy of the literature review and recommendations.

The writer also plans to prepare several journal articles based upon the practicum activities.

The final method of dissemination will be the preparation of a video entitled "The Marriage of Cooperative Learning and Technology". The video would include taped teacher interviews, scenes from the writer's classroom highlighting students actively involved in technology and collaborative learning, and a section on how this could be accomplished within a school. The last section would be based on the four phases of this practicum.

References

Adams, J. A. (1993). Technology and changing teacher roles:the district level perspective. *Florida Technology in Education*. 5(1 & 2), 81-85.

Apple, M.W. (1992). Computers in schools: salvation or social disaster. *Education Digest*, 47-52.

Beals, D. (1991). Computer mediated communication among beginning teachers. *Technological Horizons in Education*, 18(9), 74-77.

Bell, T.H. & Lemquist, D.L. (1992). Technology: a catalyst for restructuring schools. *Electronic Learning*, 8(2), 10-11.

Berger, C.F. & Novak, D. I. (1991). Integrating technology into teacher education. *Technological Horizons in Education*, 19(2), 83-86.

Bruder, I. (1992). Can technology help? *Electronic Learning*, 12(3), 18-19.

Byers, P. L. (1992). *Improved computer technology skills for a middle school faculty through inservice training*. Fort Lauderdale,FL: Nova University. (ERIC Document Reproduction Service No. ED 350983)

Dewey, J. (1916). *Democracy and Education: An Introduction to the Philosophy of Education* New York, NY: McMillan.

DeVillar, R.A. & Faltis, C.J. (1991). *Computers and Cultural Diversity: Restructuring for School Success*. Albany,NY: State University of New York Press.

D'Ignazio, F. (1990). Integrating the work environment of the 1990's into today's classrooms. *Technological Horizons in Education*, 18 (2), 95-96.

Dishon D. & O'Leary, P. (1984). *A Guidebook for Cooperative Learning*. Holmes Beach,FL: Learning Publications Inc.

Dupagne, M. & Krendl, K. (1992). Teachers' attitudes toward computers: A review of the literature. *Journal of Research on Computing in Education*, 24 (3), 420-425.

Florida Department of Education. (1991). Blueprint 2000 : Initial Recommendations for a System of School Improvement and Accountability. Tallahassee, FL: State of Florida, Department of State.

Florida Department of Education, (1992). Blueprint 2000 for Teachers. Tallahassee, FL: State of Florida, Department of State.

Fowler, C. (1993). Technology and changing teacher roles: Keys to school reform. Florida Technology in Education Quarterly, 5(1 & 2), 17-24.

Foyle, H.C. & Lyman L. (1991). Cooperative learning: What you need to know. (Stock No. 5189-0-00). Washington,DC: National Education Association.

Glasser, W. (1987). Control theory in the classroom. The International Association for the Study of Cooperation in the classroom, Newsletter. 8 (2 & 3).

Hand, T. (1993, March 24). McIntosh Middle School Daily Bulletin (Available from McIntosh Middle School, 701 S. McIntosh Road, Sarasota, Fl. 34242).

Holden, C. (1989). Computers Make Slow Progress in class. Science, 24 (4), 906-909.

Johnson, D.W., Johnson,R., Holubec,E.,& Roy, P. (1984). Relevance of research on cooperative learning. In Circles of Learning:Cooperation in the Classroom Alexandria,VA: Association for Supervision and Curriculum.

Johnson, J.M. & Johnson, R.T. (1975). Learning together and alone: cooperation, competition, and individualization. Englewood Cliff,NJ: Prentice Hall.

Jones, N.J. & Woodhouse, D. (1988). Professional Development for effective use of computers in the classroom. Evaluation and Program Planning, 11, 315-323.

Katz, Y. (1992). Toward a personality profile of a successful computer-using teacher. Educational Technology, 32(2), 39-40.

Kelly, H. (1990). Technology and the transformation of American education. Technological Horizons in Education , 18 (3), 86-88.

Kozol, J. (1991). Rich child, poor child. Electronic Learning. Special Edition, 56.

Lee, T. (1991). Managing a technology staff development project. Technological Horizons in Education. 18 (9), 71-74.

Lewis, P.H. (1988, January 31). The computer revolution revised. The New York Times, p. 26-27.

Martin, D. (1988, April). Ethnographic methods for studying microcomputer implementation in schools. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Marshall, R. (1990). Solving the problem at the source. Working Woman, 15 (1), 67-71.

Moursund, D. (1992). Restructuring education for the information age. Part 8: measures of success. The Computing Teacher, p. 3-13.

O'Donnell, P. (1988). Preparing schools for the year 2000 Chicago, Il: Society for Visual Education, Inc.

Poirot, J.L.(1993). Assessing and evaluating student gains.The Computing Teacher.20 (4), p. 30-31.3

Pritchard, W. & Busby, J. (1991). A blueprint for successfully integrating technology into your institution. Macintosh Supplement to Technological Horizons in Education (November 1991), 48-54.

Ravid, R. & Shapiro, R. (1992). The use of cooperative learning in Jewish schools. Journal of Research and Development in Education. 25 (2).

Ringstaff, C. & Sandholtz, J. (1992-93). Trading places: When students become the experts. Apple Education Review , (3), p. 6.

Schlumpf, J. F. (1991). Empowering k-12 teachers. Technological Horizons in Education, 18 (9), 81-82.

Scisco, R. (1992). Kids and Computers: A Magazine for Parents. 1 (1).

Scrogan, L. (1989). The OTA report:Teachers, training and Technology. Classroom Computer Learning, San Rafael,CA: Peter Li, Inc.

Sculley, J. (1990). Educational reform for a global dynamic economy. MacIntosh Special Issue, 4-6.

State Board of Education. (1989). Summit recommendations from Florida's education summit. Miami, FL: Florida International University.

Stevenson, H. W. & Stigler, J.W. (1991). How Asian Teachers polish each lesson to perfection. American Educator. 15 (1), 12-20, 43-47.

Sturdivant, P. (March 1989). Technology training ...some lessons can be learned. Educational Technology, p. 31-35.

Thornburg, D. D. (1989). Education, Technology, and Paradigms of Change for the 21st Century. Monterey, CA: Starsong Publications.

Tobin, L. Faculty training in computers and composition. College Composition and Communication, 38(2), 195-198.

United States Department of Commerce, Bureau of the Census (1991). 1990 Census of Population and Housing (P.L. 94-171 Redistricting Data). Washington, D.C.: U.S. Government Printing Office.

United States Department of Education. (1991). America 2000: An Education Strategy. Washington, DC: U.S. Department of Education.

Weir, S. (1989). The computer in schools:Machine as humanizer. Proceedings of Harvard University Symposium: Visions for the use of computers in classroom instruction. Harvard Educational Review. 59(1), 61-73.

Woodward, J. & Gerstein, R. (1988). Innovative technology for secondary learning disabled students : a multi-faceted study of implementation. (Report No. IR014526). Eugene, OR: University of Oregon. (ERIC Document Reproduction Service No. ED3222883).

APPENDICES

APPENDIX A

DOCUMENTATION SURVEY

APPENDIX A

TO: All Faculty

FROM: Technology Committee

DATE: June 1992

SUBJECT: Computer Use-Network Awareness Questionnaire

Our students must be prepared to go forth into the world of technology, and it is our job to prepare them to do this. This year our school will be piloting a special technology project called the Secondary Hi-Tech Classroom Project. This project will provide the latest technology such as CD_ROM's, LCD units which enable the teacher to use the computer as a whole class teaching tool, video-disc players, and camcorders. One important goal of the project is to use this technology to make the classroom an exciting environment and to share this excitement with all members of the faculty. It would seem that there is a need for faculty awareness and teacher training in this area of computers and other hi-tech equipment. The purpose of this questionnaire is two fold: to document this need and to gather information on what would be most useful to YOU if this need is established.

Each faculty member is asked to fill out the survey and return to before leaving for the summer. Your time and effort, especially at this time of the year, will be GREATLY appreciated. MANY THANKS1111

PLEASE COMPLETE THE FOLLOWING. The average time to complete this survey is five minutes. Most questions can be answered by a check mark, number, or "yes" or "no".

COLLECTION DATA

1. Grade level ____6th ____7th ____8th ____ESE
2. Female _____ Male_______
3. Age: ____20-29 ____30-39 ____40-49 ____50 or above
4. Highest degree earned:
   ____Bachelor ____Masters
5. Number of years teaching _____

COMPUTER USAGE(school, home, other business)

1. Which category best describes your use of computers? non-user_____ novice______ intermediate_____ advanced_____

APPENDIX A

2. If you do use computers, how many years have
you used them? ____less than a year____one year
_____two years ____3-4 years _____5 years or more

3. Have you ever received any formal training in using
computers? _____yes ______no

4. Have you received any formal training in the use of
other hi-tech equipment? _____yes _____no

5. Do you own a computer? ______

6. If you do have a computer at home, please check
how you use it. ____word processing ____spread sheet
____data base ____with a phone modem _____games
____graphics _____OTHER (please explain) ______________

7. Are personal computers available at school for your
use? ______yes ______no
____
____

8. Do you anticipate having a computer as part of your
classroom equipment during the 92-93 school year?
______yes _____How many? ______no

9. If you have had a computer in your classroom previously,
answer these questions:
A. How frequently did you use your computer?
______daily _____frequently ______occasionally
______almost never _____never

B. What did you use the computer for? Please check
appropriate spaces. ____student instruction
______games ______teacher management(grade book,
preparing tests etc. ______word processing
______in conjunction with a LCD overhead

COMPUTER-TECHNOLOGY KNOWLEDGE

Which of these "technology terms" do you know? Please
indicate with the following code: U (unknown),
F (familiar), or K (known:can define with confidence).

_____LCD
_____CD Rom
_____Laser disk
____teleconferencing
____"on-line"
____mouse

APPENDIX A

_____Interactive video ____hard drive
_____electronic mail ____telecommunications
_____National Geographic "Kid's Network"
_____networked computer systems

Are you aware of the benefits that an integrated technology system (computers linked with CD-ROMs, videodisc players, LCD's, and and large group display units) offers as an instructional tool? ______yes _____no

If you answered "yes" above, please list the main benefits.
____
____
____

TEACHER TRAINING-TECHNOLOGY

Which of these areas would be MOST USEFUL TO YOU in an in-service training program? Please check the appropriate items.

_____Learning of the benefits of high technology in the classroom.
_____Step by step instruction in the use of the computers.
_____Learning about the latest "technology" equipment, particularly what we have available at our school.
_____Learning about the educational software that we have at our school, especially in your curriculum area.
_____Teaching strategies for incorporating computers into instruction.
_____Other
____
____

Would the development of a video tape with step-by-step instructions on the use of our computers and/or other technology equipment be helpful to you?
_______yes ________no

If a need is established for teacher training with the networked system, would you be interested in taking this training if it were offered at our school?

_______yes _______no

APPENDIX B

IN-SERVICE TRAINING PRE/POST ASSESSMENT

APPENDIX B

TEACHING WITH TECHNOLOGY AND COOPERATIVE LEARNING

PRE/POST ASSESSMENT

DESCRIPTIVE INFORMATION

Name__________________________________ Grade_______

Female____ Male ____ Number of years teaching ____

Age: 20-29_____ 30-39_____ 40-49 _____ 50+_____

Highest Degree Earned: Bachelors _____ Masters_____

TECHNOLOGY SKILLS YES ☐ NO ☐

Directions: If you have a working knowledge of the skill, check the "yes" box. This would indicate that you do use or could use the specific technology and that you could demonstrate the set-up and operation of the equipment. Otherwise, check the "no" box.

1. Personal computers YES ☐ NO ☐

Can you turn the computer on and off, load a disk into the machine, open a file in most programs, close a file, and save data to a disk or the hard-drive?

2. Networked computers YES ☐ NO ☐

Can you turn the computer on and off, get on the network, open a file, close a file, and save data to a disk or the hard-drive?

3. Camcorders YES ☐ NO ☐

Can you operate a camcorder, produce acceptable videos, and show them through the use of a VCR?

4. CD ROM YES ☐ NO ☐

Can you operate a CD ROM player including the set-up prior to operation?

5. LCD units used with overhead projectors YES ☐ NO ☐

Can you operate a LCD unit including the set-up prior to operation?

6. Phone modems and telecommunicatons YES ☐ NO ☐

APPENDIX B

Can you operate a phone modem and the necessary computer software including the set-up prior to use?

7. VCR YES ☐ NO ☐

Can you operate a VCR including the set-up prior to use?

8. Videodisc players YES ☐ NO ☐

Can you operate a videodisc player and the computer software that is necessary to use with Level III videodiscs? Can you set up the equipment?

OTHER QUESTIONS

1. Cooperative Learning YES ☐ NO ☐

Do you use cooperative learning (small groups seated and working together on a common task) as a teaching strategy?

2. Self rating as a user of technology

How would you rate yourself as a user of technology?

____ non-user

____ moderate user, but do not use in classroom or lab

____ moderate user in classroom and/or lab

____ expert user, but do not use in the classroom

____ expert user in classroom and/or lab

3. Barriers to the use of technology

What do you feel is your greatest barrier to not using computers more frequently?

____

4. Goals for this in-service training

List 3 personal goals that you hope to accomplish through this training.

____

____

____

APPENDIX C

IN-SERVICE PARTICIPANTS' CHECKLIST

APPENDIX C

TEACHING WITH TECHNOLOGY AND COOPERATIVE LEARNING

PARTICIPANT CHECK LIST

1. AVAILABILITY OF TECHNOLOGY EQUIPMENT

Directions: If the following equipment is available for your use, put a check mark in the first space. Leave the space blank if the equipment is not available for your use.

a. Personal Computers ____ ______

b. Networked Computers ____ ______

c. Camcorders ____ ______

d. CD ROM ____ ______

e. LCD units with overheads ____ ______

f. Phone modem ____ ______

g. VCR ____ ______

h. Videodisc players ____ ______

2. PERSONAL USE OF TECHNOLOGY EQUIPMENT

If you possess the skills necessary to use the equipment on the list above, please put "yes" in the second space. If you do not have the necessary skills, put "no" in the second space.

3. AVAILABILITY OF TECHNICAL SUPPORT

Is technical support available to you when you are attempting to use technology in instruction? Answer "yes" only if you can be guaranteed of having a person assist you either in the classroom or the computer lab when you need them. Answer "no" if you are not sure whether help will be available when you need it.

Yes ______ No ______

4. FREQUENCY OF TECHNOLOGY EQUIPMENT USE

Please list below any technology equipment that you use at least once a week in instruction.

____

APPENDIX D

IN-SERVICE PARTICIPANTS' LESSON EVALUATION

APPENDIX D

TEACHING WITH TECHNOLOGY AND COOPERATIVE LEARNING

LESSON EVALUATION

Name ____

Unit Title ____

Brief Description of Unit

____

____

____

Lesson Objective _____________________________________

____

____

Description of Technology used in lesson ______________

____

____

Evaluation of Lesson

Was the lesson successful? ___________________________

What was the most positive element of the lesson?

____

____

Is there anything that you would change about the lesson when doing it again?

____

____

Were there any problems in the use of technology?

____

____

APPENDIX D

How could the "technology problems" be overcome?

____

____

If you used cooperative learning as a component of this lesson, were there any problems?

____

____

How could the "cooperative learning problems" be overcome?

____

____

APPENDIX E

EXPLANATION OF THE TECHNOLOGY "WHIZ KIDS"

APPENDIX E

TECHNOLOGY WHIZ KIDS
MCINTOSH MIDDLE SCHOOL TEACHER SUPPORT GROUP

The Technology "Whiz Kids" are a group of seventh and eighth grade students who are being trained to assist McIntosh teachers when they are using technology. When their training is complete (February 1, 1993), they will be available to help you in the classroom, in the media center using the card catalogue, or in the computer lab.

It is hoped that this program will encourage both novice and advanced teacher users of technology to implement more lessons involving the use of available equipment at our school. The equipment that they will be trained to use includes: computers, VCRs, Camcorders, CD ROMs, Laserdisc players, and LCD (liquid crystal display; allows you to project computer screen on a low heat overhead).

PROCEDURE FOR PROCURING A "WHIZ KID"

1. Put a request form in mailbox. Try to give a week of advanced time for scheduling purposes.

2. You will receive notification indicating who has been assigned to you and their Prime Time teacher's name in the event you want to contact them. Please keep the notification form as it will have a very brief evaluation section which you will be asked to complete and return to Pat.

3. The students will report to you on the assigned day.

4. You complete and return the notification/evaluation form.

FORMS

Samples of the forms can be found on the back of this paper. You will also be given **ONE** request form. Please **DUPLICATE** this form for future use.

THANK YOU SO MUCH FOR YOUR COOPERATION IN THIS EFFORT.

APPENDIX F

REQUEST FORMS FOR STUDENT TECHNOLOGY AIDES

APPENDIX F

REQUEST FORM FOR TECHNOLOGY "WHIZ KID"

Requesting teacher's name and grade ____________________

Room number where support is needed ____________________

Day/ date you need support ____________________

Time/times you need support. Please include beginning and ending times of your periods. There will be a 1/2 hour block of "lead-in" time allowed the "Whiz Kid" in order to complete hook-ups etc.

PERIOD	BEGINNING TIME	ENDING TIME

Please check the technology equipment you plan to use.

________ computers(please circle kind-IBM, APPLE,TANDY,MAC)

________ VCR

________ Camcorder

________ CD ROM

________ Laserdisc player

________ LCD (liquid crystal display-allows you to project computer screen via a LOW HEAT overhead projector)

What software will you use?____________________
(Name laserdisc, computer software etc. IF ANY)

TEACHER MUST SIGN UP FOR ALL HARDWARE AND SOFTWARE IN THE MEDIA CENTER OR THROUGH CENTRAL SERVICES, AS ALWAYS.

STUDENT ASSIGNED ____________________

STUDENT'S PRIME TIME TEACHER ____________________

BASIC SKILLS TEACHERS' PERMISSION
(Basic Skills teachers, please initial)

Period 1______	Period 5________
Period 2______	Period 6________
Period 3______	Period 7________
Period 4______	

PE /EXPLO TEACHERS'PERMISSION
PE ______
EXPLO ______

APPENDIX G

TEACHER INTERVIEW QUESTIONS

APPENDIX G

QUESTIONNAIRE FOR INTERVIEW

1. Do you own a computer?

   How do you use your computer?

   How often do you use your computer?

   Approximately how many software programs do you own?

   Do you plan to "upgrade" your equipment eventually?

2. What problems have you encountered using computers either at home or at your workplace?

3. Do you own other high tech equipment (CD player,VCR)?

4. Do you have a computer available for use in your school setting? ______yes _______no

5. Where is it located?

6. Do you use a computer as part of your teaching strategy?

   How frequently: _____daily______2-3 times a week
   _____once a month

7. If you don't use computers, which of the following

APPENDIX G

QUESTIONNAIRE FOR INTERVIEW

1. Do you own a computer?

   How do you use your computer?

   How often do you use your computer?

   Approximately how many software programs do you own?

   Do you plan to "upgrade" your equipment eventually?

2. What problems have you encountered using computers either at home or at your workplace?

3. Do you own other high tech equipment (CD player,VCR)?

4. Do you have a computer available for use in your school setting? ______yes ________no

5. Where is it located?

6. Do you use a computer as part of your teaching strategy? •

   How frequently: ______daily______2-3 times a week

   _____once a month

7. If you don't use computers, which of the following

BEST COPY AVAILABLE

keeps you from using them?

a. I don't like computers

b. I don't know how to use them in classroom instruction (teaching strategies)

c. I feel unsure of my skills

d. I haven't had enough training

e. I feel a lack of support from staff at school

f. I am unaware of software available and/or I don't know how to use it.

g. The hardware and software are not compatible

h. Are there other reasons?

8. What would you like to be able to do with technology?

9. Is continuing training important in technology?

10. What could your school do to support you?

11. Why do you feel computers are not being used to their greatest potential in the educational setting?

12. Descriptive information

Gender

Age catagory ____ under 30 ______over 30

Years teaching

Grade level

BEST COPY AVAILABLE

APPENDIX H

PARENT PRE/POST SURVEY

APPENDIX H

PARENT PRE/POST SURVEY

1. What technology do your have available in your home? (An example would be a TV, VCR, CAMCORDER etc.)

   a. ______________________________

   b. ______________________________

   c. ______________________________

   d. ______________________________

2. What is the PRIMARY use of the technology that you listed in number 1? Would it be EDUCATIONAL (E) or RECREATIONAL (R)? Please put an "R" or an "E" next to each response in number 1.

3. Please list any way that your home technology is being or could be used in an educational way. (An example would be using the TV to view "classic" novels such as The CAll of the Wild.

   a. ______________________________

   b. ______________________________

   c. ______________________________

4. How do you think that technology is being used in school?

____

____

____

5. Which technology on the following list are you familiar with; please indicate with a check mark if you know what it is and how it is used.
   personal computers _____
   networked computers_____
   camcorders _____
   CD ROM _____
   LCD _____
   VCR _____
   videodisc player _____

APPENDIX I

PROFESSIONAL DEVELOPMENT CENTER EVALUATION FORM

TEACHER EDUCATION CENTER

ACTIVITY EVALUATION

ACTIVITY NAME: ______________________________ DATE(S): ________________

YOUR COMMENTS ON THIS ACTIVITY ARE VERY IMPORTANT TO US.
PLEASE TAKE A FEW MOMENTS TO ANSWER THESE QUESTIONS.

4 – STRONGLY AGREE 3 – AGREE 2 – DISAGREE 1 – STRONGLY DISAGREE 0 – NO OPINION

Please circle one number for the first five questions:

1. The activity fulfilled its description or objectives.	4	3	2	1	0
2. The activity was relevant to my needs and interests.	4	3	2	1	0
3. The instructor/facilitator was knowledgeable and prepared.	4	3	2	1	0
4. The participants had an opportunity to get involved and to ask questions.	4	3	2	1	0
5. I feel prepared to apply what I learned in this activity.	4	3	2	1	0

6. What I valued most about this activity:

7. What I would like to see improved in this activity:

8. What I still need in addition to or as a follow-up to this activity.

Other comments:

THANK YOU! • PLEASE RETURN FORMS TO TEACHER EDUCATION CENTER via PONY MAIL •

APPENDIX J

IN-SERVICE TRAINING OBJECTIVES

APPENDIX J

COMPONENT NAME:	TECHNOLOGY USE AND INSTRUCTIONAL STRATEGIES
COMPONENT NUMBER:	52234200
MAXIMUM INSERVICE POINTS:	30

GENERAL OBJECTIVE:

This course will offer educators the opportunity to develop proficiency in the use of the latest technology through hands-on activities. The participants will develop the skills necessary to implement technology in instruction through the use of cooperative/collaborative learning strategies.

SPECIFIC OBJECTIVES:

Participants will be able to:

1. Turn on a computer (both stand alone or networked), boot up, print a document, and save.
2. Use at least two different integrated software programs to produce a word processing document.
3. Complete a software evaluation for their discipline, prepare a brief summary of the program, and a list of step-by-step directions in how to use it.
4. Operate a CD ROM and examine some available software.
5. Operate a laserdisc and examine some available software.
6. Operate a camcorder, take some videos, and review them for strengths and weaknesses.
7. Operate an LCD panel while investigation appropriate software for whole class instruction while using a computer.
8. Operate a phone modem for the purpose of telecommunications.
9. Explain the function of cooperative learning as a teaching strategy.
10. Plan and implement a cooperative learning activity in the classroom for students.

APPENDIX J

DESCRIPTION OF ACTIVITIES:

Participants will:

1. Attend lecture by the instructor using high tech equipment.
2. Work cooperatively in small groups.
3. Participate in hands-on activities using computers, CD ROMs, videodisc players, camcorders, LCDs, and phone modems.
4. Engage in on-going support with the formation of a mentor group.

EVALUATION:

1. Participants will submit a written report and product.
2. Participants will demonstrate increased knowledge of (80) percent of the specific objectives as measured by objective-based pre-and post-tests.
3. All participants will be asked to complete the Teacher Education Activity Evaluation form upon component completion. Instructors and consultants will be asked to complete a similar form for instructors.

APPENDIX K

FACULTY PRESENTATION OUTLINE

IMPLICATIONS OF HIGH TECH IN THE CLASSROOM

I. ISSUE 1 - HISTORICAL DEVELOPMENT - TECHNOLOGY

A. CHANGING WORLD DUE TO TECHNOLOGY

B. CHANGING JOB MARKET

C. NEED FOR RESTRUCTURING EDUCATIONAL SYSTEM

   1. EFFECTIVE TEACHING

   2. COMPUTER SKILLS

APPENDIX K

APPENDIX K

II. ISSUE 2 - TEACHING STRATEGIES WITH COMPUTERS

A. INTRODUCTION
    1. EXPERT ASSISTANT
    2. INFORMATION PROVIDER

B. TIME SAVER
    1. MANAGEMENT TOOL

C. TEACHING TOOL
    1. INTEGRATION OF CURRICULA
    2. TEACH LITERACY
    3. USE OF SOFTWARE
    4. INDIVIDUAL DIFFERENCES
    5. COLLABORATIVE LEARNING

APPENDIX L

DESCRIPTIVE INFORMATION ON PARTICIPANTS

APPENDIX L

DESCRIPTIVE INFORMATION ON PARTICIPANTS

Assignment

7%	6th Grade
36%	7th Grade
36%	8th Grade
21%	Other-including administration

Gender

71%	Female
29%	Male

Highest Degree

64%	Master
36%	Bachelor

Average Years of Teaching	21 Years

Age Range

0%	20-29
7%	30-39
64%	40-49
29%	50+

APPENDIX M

TEACHER COURSEWARE EVALUATION FORM

APPENDIX M
TEACHER COURSEWARE EVALUATION FORM

NAME:____

SCHOOL:____

SOFTWARE INFORMATIONS:___________________________________

NAME:____

VENDOR:____

CURRICULUM AREA:____

EVALUATION:

CONTENT:	**HIGH............LOW**
Appropriate for use in conjunction with other technology (T.V., Overhead, etc.)	5__4__3__2__1__
Factually Accurate	5__4__3__2__1__
Pedagogically Sound	5__4__3__2__1__
Language/Terminology Accurate and Appropriate	5__4__3__2__1__
Appropriate Feedback to User	5__4__3__2__1__
Requires Decision Making/Problem Solving	5__4__3__2__1__
Helps student with their classwork	5__4__3__2__1__
INDIVIDUALIZED PACING:	
Variable Speed	5__4__3__2__1__
Variable Level	5__4__3__2__1__
EASE OF USE:	
Directions Clear	5__4__3__2__1__
Easy Access/Exit	5__4__3__2__1__
Help Available Easily	5__4__3__2__1__
SCREEN PRESENTATION:	
Legibility (Easy to Read)	5__4__3__2__1__
Layout	5__4__3__2__1__
Color/Graphics	5__4__3__2__1__
Sound	5__4__3__2__1__
DOCUMENTATION:	
On-line	5__4__3__2__1__
Printed Materials	5__4__3__2__1__
OVERALL EVALUATION:	
Total Ranking	5__4__3__2__1__
Grade Level Objectives covered	5__4__3__2__1__

ADDITIONAL COMMENTS:_____________________________________

____

____

____

____

____

APPENDIX N

WELCOME/PERMISSION-TECHNOLOGY WHIZ KIDS

APPENDIX N

TECHNOLOGY WHIZ KIDS
1992-93

Dear _______________,

Congratulations!! You have been chosen by the teachers on your team to take part in an exciting new project at McIntosh Middle School.

You will be part of a group of approximately 25 students who will be trained in the use of the following technology: computers, VCRs, camcorders, CD ROMs, laserdisc players, and LCDs. If some of this equipment sounds "foreign" to you now, don't worry, you'll soon know all about it!!!

Following your training, you will serve as an assistant/support person for teachers and their classes who are using technology. You may be with them in their classroom or down in the school computer lab. Since your assignment will be on a rotating schedule with approximately 19 other students, you should only be out of class occasionally. Your team teachers are aware of this, and will receive notification each time you need to be away from their class.

You should be very proud of being chosen to take part in this special activity. Your team teachers, by chosing you, have indicated that you are very dependable, polite, technology "savy", and most of all-willing to go the "extra mile" for your school.

Please sign in the appropriate space below and have your parents sign as well. Return this slip to Mrs. Byers in room 552 (8th grade hall). The training will be in that room. It will begin during PRIME TIME ON DECEMBER 10TH AND CONTINUE EVERY OTHER FRIDAY.

Thank you,

____
Parent Signature

____
Student Name (Please print)

APPENDIX O

TECHNOLOGY WHIZ KIDS EVLAUATION FORM

APPENDIX O

STUDENT ASSIGNMENT AND EVALUATION

STUDENT NAME ____________________________________

STUDENT'S GRADE____________________________________

STUDENT'S PRIME TIME ______________________________

EVALUATION

1. Student was punctual	yes	no
2. Student was helpful	yes	no
3. Student was polite	yes	no
4. Student acted in a responsible manner	yes	no

OVER-ALL RATING

I would rate this student's assistance in my class as being:
_____EXCELLENT _______SATISFACTORY _______NEEDING IMPROVEMENT

SUGGESTIONS FOR IMPROVEMENT OF THE PROGRAM

____

____

BEST COPY AVAILABLE

APPENDIX P

PARENT RECOMMENDATIONS-TECHNOLOGY USE

APPENDIX P

RECOMMENDATIONS FOR PARENTS FOR USE OF TECHNOLOGY IN THE HOME

General Recommendations

1. Buy a computer, printer, and modem if possible. Research indicates that students with computers usually get better grades and are more interested in school.

2. Subscribe to computer magazines, if possible. One example is: *Kids and Computers: A Magazine for Parents.* This magazine is published by Empire Publications in Anaheim Hills, CA.

Recommendations for Educational Use of Home Technology

TV

1. Encourage the viewing of educational stations. Monitor other viewing.

2. Watch news programs together as a family followed by discussions of interesting items.

3. After viewing "classic movies", encourage your child to read the book.

VCR

1. Rent "classic movies". Discuss them after viewing. Discussion items could include: setting, characters, story line.

2. Tape educational TV for later viewing and reviewing.

CAMCORDER

1. Request to use the camcorder in preparing assignments for school.

2. Tape family events and trips.

COMPUTER

1. Encourage the use of the computer for preparing daily homework for school.

2. Use specific software to learn such things as typing, a foreign language, phonics, math and so on.

3. Use educational games, particularly those that stimulate creative and critical thinking.

4. Use data base software to organize such things as daily chores or to have children budget their money.

APPENDIX Q

TECHNOLOGY GRANT WRITING INFORMATION

APPENDIX Q

GRANT WRITING INFORMATION

Federal Sources

1. First Programs-grants that stress improvements in several areas including educational technology and instructional strategies. They are awarded to districts to increase access of all students to a high quality education.
    CONTACT: Education Department (202-357-6496)

2. National Science Foundation-funds many projects involving science,math, staff development, and educational technology.
    CONTACT: The National Science Foundation
    1800 G Street N.W.
    Washington, D.C. 20550
    (202-357-7880)

Local Education Funds

For information of the local education fund nearest you:
CONTACT: The Public Education Fund Network
600 Grant Street
Pittsburg, PA. 15219
(412-391-3235)

Computer Companies

1. Apple Computer Company-current educational grant program in called Crossroads.
    CONTACT: Apple Computer Incorporated
    20525 Manani Ave.
    Cupertino, CA 95014
    (408-974-2974)

2. IBM Corporation-offers numerous grants.
    CONTACT: IBM Educational Systems
    P.O. Box 2150
    Atlanta, GA 30055

Foundations

1. Carnegie Corporation
    437 Madison Ave.
    New York, N.Y. 10022
    (212-371-3200)

2. Exxon Education Foundation
    320 East J.W. Carpenter Freeway
    Irving, TX 75062
    (214-444-1000)

Appendix Q

3. The Ford Foundation
   320 East 43rd St.
   New York, N.Y. 10017
   (212-573-5000)

4. Transamerica Corp.
   600 Montgomery St.
   San Francisco, CA 94111
   (415-983-4094)

Grant Resource Guides

1. The Foundation Directory and Directory of Corporate Giving

This Foundation Center is a comprehensive source on fund raising in the United States.

CONTACT: The Foundation Center
79 Fifth Avenue
New York, N.Y. 10003
(1-800-424-9836)

2. Federal Guides.

These guides give general listings and information:

a. 1993 Guide to Department of Education Programs
b. Federal Register

CONTACT: Superintendent of Documents
Government Printing Office
Washington, DC 20402
(202-783-3238)